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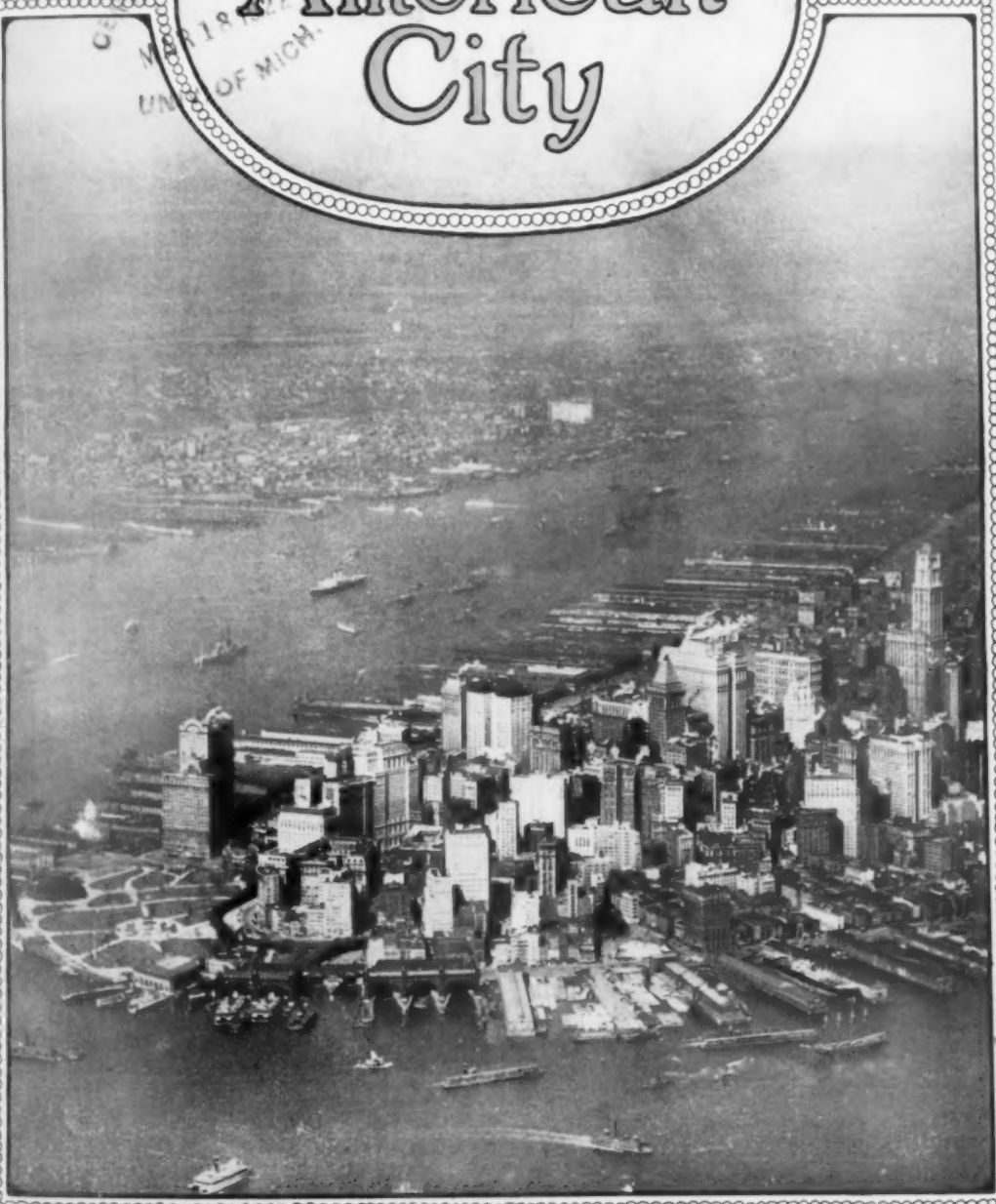

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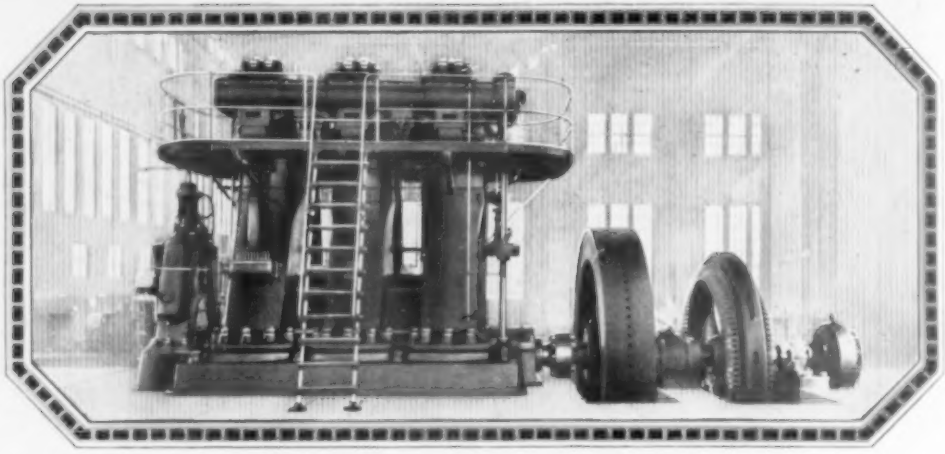
Aeroplane View of Lower New York—See "A New Aid in City Planning," page 209



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That's the record for the month of April 15 to May 15, 1921, of a 500 horsepower Fulton Diesel Oil Engine in the central station of Miami, Oklahoma.

Here's a table which gives an analysis of this cost:

Total time in month	720 hrs.
Total time in operation	700 hrs.
Total time down for care and inspection	20 hrs.
[1]338.2 bbls. fuel oil, $2.12 per bbl	$716.98
[2]57 gal. cyl. oil, .835 per gal	47.495
[2]124 gal. eng. oil, .54 per gal	66.96
[2] gal. cur. oil, $1.00 per gal	.50
Wiping rags	1.80
Repairs	.00
[3]Labor	896.96
Total	$1,730.70
Output for month	158,600 kw. hrs.
Total cost per kw. hr	$ .0109

[1] Fuel cost is higher than market due to an old contract.
[2] All lubricating oil purchased was not used. 40 gallons covers average total monthly consumption.
[3] Labor cost includes salary of master mechanic who has charge of all city equipment.

(Signed) CHAS. ELLIS, Supt. L. & W. Dept.

The Fulton Diesel Engine in the Miami plant replaced steam power equipment. Its month to month service has proved so satisfactory and economical that a second Fulton Diesel is being installed.

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Volume XXVI Number 3

The American City Magazine

New York March 1922

A New Aid in City Planning

By Nelson P. Lewis
Consulting City Planning Engineer

IN all city planning work a knowledge of the topography is one of the first essentials. Where the surface is at all irregular, a quite accurate topographic survey is necessary before the plan can be worked out in detail, and it is obvious that such a survey of the entire area would be of much value in the preliminary study. A topographic survey, as generally understood, would, however, involve large expense, while great accuracy is unnecessary during the earlier stages of city planning.

It might be well also to emphasize the fact that in planning new territory it is a

PORTRAYING THE COMPARATIVE DEVELOPMENT ON TWO SIDES OF A RIVER

In the above view, note the many industrial plants on one side of a navigable waterway and their entire absence on the other. The explanation is found in the fact that one side has trunk line railway connections, while the other has none. It is quite obvious what is needed to make available for industries the water-front property now unused

mistake to make the first plans in great detail. The essential thing is the general character of the plan, which should be worked out in a logical manner, and if that be done with the existing topographical conditions as a basis, the plan cannot well be spoiled in the subsequent elaboration of detail. But instrumental field surveys, even to obtain such data as may be necessary to lay down tentatively the general structure of the plan, not only require much time and expense, but involve some work which must be done over again when the complete topographic survey is made.

A Quick, Comprehensive Survey

The development of aerial photography has made it possible to secure information of very great value at relatively small expense; such information as will make it possible to decide both quickly and intelligently upon some general features of the plan which can be developed most economically and with best adaptation to topography. One can ride, or even walk, over the territory for which a plan is desired; he may follow the valleys, climb over the ridges, observe the location of buildings and of wooded tracts available for public playgrounds and other essential features, but will retain only a confused idea of their position with respect to each other. Suppose, however, he were able to look down upon this same territory from a height of one or two miles and to carry with him a permanent and accurate record of what he saw, how greatly it would help him to decide upon the general scheme, the details of which may be developed later.

He could not, of course, get an accurate impression as to relative elevations. A very good idea of surface irregularities, however, can be secured from the contour maps of the Geological Survey and from occasional oblique views taken from the same or a lower elevation than that from which were secured the vertical views which when put together as a mosaic make the sort of map which the writer has in mind. A small cluster of houses, or other buildings, is noted on one part of the map, a larger group in another, while an almost continuous line of buildings traverses it in a certain direction. A careful examination of the picture will show the reason. You can trace a railroad running up a valley, along which are scattered these different groups of buildings; you will see an improved road along which there is a series of homes and outbuildings; the sparkle of running water shows an intersecting valley; lakes or ponds can be discovered either in the open or surrounded by what appears to be a luxuriant forest growth.

Obviously, the opportunities for taking advantage of existing conditions in developing a plan for the territory are greatly increased. In following a navigable waterway, one side is found to be quite intensively used as sites for industrial plants; the other is almost entirely undeveloped. What is the reason for this? A close examination of the picture will probably show that there are railroads running down to one side of the waterway and there, where rail and water meet, are the industrial plants. The other side of the stream has just as good facilities for water transportation, but no railroads. This fact will give a valuable hint to one studying the situation, as to what is needed to insure better use of natural facilities for transportation and to promote industrial development.

It is not only in the mapping of undeveloped territory or of new additions to existing towns that this new art is of very great assistance. Much of the work of city planning is devoted to the correction of mistakes or supplying omissions in the plans of territory already intensively developed. We may be well aware of the defects of the present plan, may realize the need of additional thoroughfares to relieve existing congestion, may appreciate the need of better connections between the different units of our park system, may feel that our waterfront should be utilized to better advantage; but riding or walking about the town or the careful study of maps will not give us such a vivid impression of the existing conditions or help us to arrive at a possible solution, as will the opportunity to look down upon the city from an elevation sufficient to give a distinct view of the area as a whole, but low enough to enable us to see every important detail.

Traffic Conditions Clearly Seen

There are the long lines of vehicles collecting alternately on two important streets at their intersection, while at another point a gyratory movement of traffic permits all

The photograph and line map above illustrate the advantage of an aerial photographic survey in the development of a city plan. The features of the photograph to be retained were inked in on the original; the photograph was then bleached, the inked lines only remaining. A study of both photograph and line map will be of great assistance to the city planner in determining the portions of the existing layout which should be retained, the connections and additions necessary to make a rational plan, and the topographical features which should be emphasized

to keep going. There are great numbers of trucks which should be moving, but which are standing at certain piers and railroad terminals, indicating that some improvement of both rail and water terminal facilities is greatly needed. There are parks, within which we can plainly see what must be attractive drives, but even at this vantage point we can see no connections between them except by narrow streets, already crowded by miscellaneous traffic, so that those trying to go from one park to another must choose between streets none of which have the character of parkways or give the slightest evidence that they are connections between different integral parts of a park system.

There are fragments of wide streets along the water-front, which if connected with each other would provide a wonderfully interesting thoroughfare and afford relief to the congested streets further inland, and the picture plan made from above indicates where and how such connections can be made most easily and least expensively. Public buildings can readily be located and the adequacy or inadequacy of their sites as to extent and the suitability of their locations will be appreciated, and if mistakes have been made they can be avoided in the future planning of streets or new municipal buildings.

For Constructive Work in Peace-Time

We know that aerial surveys and mapping were of the greatest possible use during the World War in locating points within the enemies' lines which were vulnerable to attack, but we have found that this same method of aerial photographic surveying will disclose the logical points of attack for those who are bent, not upon destructive but upon important constructive work, upon the better utilization of natural conditions for commerce, for homes or for wholesome recreation. A relief map in the study of any territory looking to its best development would be of the greatest value, but that could be made only after the collection of accurate information and as the result of field surveys.

If then, without equipping survey parties and spending weeks and months laboriously collecting information which is later to be used in preparing maps and making relief models, we can, in as many days as the other survey would require months, obtain accurate information as to existing conditions, it is quite evident that a great advance has been made in a direction which will be of inestimable value to those planning for the future development, not only of cities, but of suburban and rural districts.

Acknowledgment: Photographs by courtesy of Fairchild Aerial Camera Corporation, New York City.

Association of Merchants Installs Street Lighting System

By A. E. Suker
Lighting Specialist

A NEW lighting system has been installed in Short Street, Lexington, Ky., as the result of the energetic work of the business men who have establishments along that thoroughfare, and instead of the six lamps which formerly illuminated it, it now has twenty-six. Short Street, which is in the business section of Lexington, is appropriately named. It is only six blocks long, extending parallel to the main street of the city and distant one block from it. It is a street of numerous small stores, the proprietors of which felt that in order to compete successfully with those on Main Street the thoroughfare would have to be inproved.

The Short Street Improvement Association was therefore organized and the work of improvement was begun. It was agreed, however, that an adequate lighting system was essential to any such program. The suggestion had been made some time before that this was needed, but it was felt that it could not be carried out for some time to come. Nevertheless, the Association began to work for the project.

The matter was taken up with the Utilities Company, which first estimated the cost at

$25,000. Later, when material became cheaper, this was reduced to $21,000. Bonds for meeting the cost were issued, and the Association, aided by the Lions Club, began the task of selling them, the Lions Club disposing of $12,600 worth. According to Maurice Loevenhart, President of the Association, the entire block of bonds was bought by fewer than 45 persons who own property or are in business on Short Street.

The Association chose a Form 6 General Electric lighting unit equipped with diffusing globe and a 1,000-candle-power lamp operated from a transformer placed on a cross-arm near the top of the pole. Where tubular steel poles are used, the secondary wires of the fixture are run inside the pole through a cap over the top, and where the unit is installed on a wooden pole, the secondary wires are run in wooden moulding down the side of the pole, and the wires enter the acorn-shaped ornament at the bottom of the gooseneck near the pole plate.

Twenty-six of these units were purchased and mounted on bishop's crook brackets attached to tubular steel poles manufactured by the Electric Railway Equipment Company. These poles are placed, staggered, at intervals of 100 feet, and the lamps are mounted at a height of 17 feet from the street to the light source.

When the new system was completed and ready for operation, Short Street reintroduced itself to the people of Lexington with a program in honor of the occasion.

The Lexington *Herald* of December 4 says of it:

"The culmination of several months of progressive effort on the part of the business men along Short Street came at 7:30 o'clock Saturday night, when the new 'White Way' blazed forth along that thoroughfare amid all the noise and bustle of a crowd of several hundred, which had gathered for the celebration that attended the event.

"Twenty-six powerful electric lights suddenly took the place of the six that have served to illuminate this section for many years, and Short Street immediately jumped into greater popularity with the people of Lexington.

"The old lights were discontinued at 7:20 o'clock in order to make the appearance of the new 'White Way' even more effective, and the street was in darkness for ten minutes, except for the glare of the headlights of the scores of automobiles that crowded the ways for the occasion. A great crowd gathered along the length of the street from Limestone to Broadway to await the inauguration of the most forward step taken by Short Street business houses in years. After the lights had been turned on, the crowd gathered on the plaza at the court house and listened to a number of selections by Storm's band, which had been engaged especially for the event."

TYPE OF NEW STREET LIGHTS IN BUSINESS SECTION, LEXINGTON, KY.

City and Street Railway Company Cooperate in Paving

Economy Made Necessary by War Conditions Produces Attractive Parkway Space for Street Railway Tracks

SALT LAKE CITY, UTAH, has recently adopted an innovation in street railway track improvement in conjunction with the local street railway company. When the paving improvement was undertaken on 7th East Street, between 5th and 13th South Streets, the question of the improvement to be made over the traction company's double-track right of way was considered. Under a municipal statute the street railway company is required to pave its right of way, including two feet outside of the outer rails. Because of the company's financial status, due to war conditions, it was very anxious to save the expense of paving its entire right of way. In addition, property owners were desirous of having center parking on the street in so far as circumstances would permit.

The upper portion of this street, between 5th and 9th South Streets, is 132 feet wide, whereas the lower portion between 9th and 13th South Streets along Liberty Park is only 66 feet wide. After a careful study of the matter, a plan of the upper portion was finally worked out, providing a center parking space 26 feet wide, in which the street railway double tracks should be laid, with a paved roadway on either side 24 feet in width. For the lower portion of 7th East Street, the double tracks were moved over to the west side of the street along the park, partly on the street and partly on park property, this leaving a 36-foot clear roadway free of tracks.

VIEW ALONG 7TH EAST STREET, SHOWING NEW PARK AREA FORMED BY MOVING STREET RAILWAY TRACKS

As a consideration, the traction company paid a material portion of the cost of paving, which was much less, however, than would have been the cost of paving the entire right of way. Since the work was completed, the traction company has planted lawn grass on these parkings, which is growing very nicely.

The consideration shown the traction company by the municipal officials is commendatory, for in these times when many traction companies are operating under unusual burdens, strict adherence to municipal statutes and franchises may cause the loss of the service of the utility to the city.

Open-Channel Drainage for Malaria Control

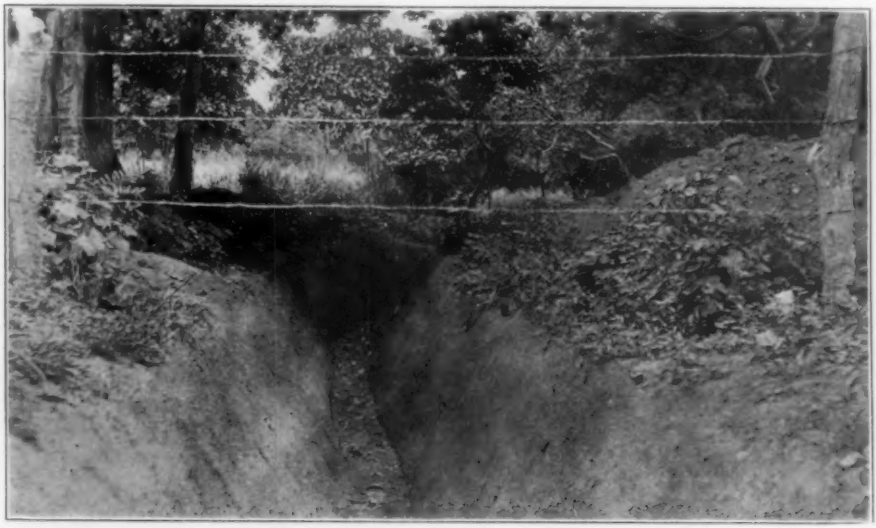
By Fernald E. Hulse

Sanitary Engineer, International Health Board

ONE of the most practical means for the physical control of malaria is the prevention of the breeding of the Anopheles mosquito. This has been done with considerable success for some time by different methods, such as the use of oil, larvicides, subsoil tile drainage, and open ditches. It is the last-named form of physical control which will be discussed in this paper.

Theoretically, drainage for the control of mosquito breeding resolves itself into mathematical calculations and is carried out on strictly engineering principles. When an area for control has been specified, an accurate topographical map should be made, noting all possible and probable breeding-places, the nature of the soil, the kind of vegetation and the rapidity of its growth, and any other features relative to drainage. Sufficient rainfall data should be collected in order that the average run-off may be calculated, and thus the amount of water that must be drained in a given time determined. When this has been done, the engineer is ready to map out the drainage system, deciding on the number, size, type, and grade of the ditches and channels to insure a rapid run-off. The size of the ditches and rechanneling of existing watercourses can be determined mathematically, but it is reserved for the engineer's personal observations to determine the type of ditch which will be most effective and have the longest life with the minimum cost of construction and maintenance.

Mosquitoes breed in great abundance in low, flat-lying areas where water is likely to stand for days and weeks at a time. The most serious drainage problems relative to malaria control will therefore be found in countries where differences in the elevation of the terrain are very slight. For example, in the Southern States along the Mississippi River the land as a rule is low and flat and in most cases below the level of the river, being protected by levees. These delta lands have a relatively high water-table, and the seepage is slow. They are therefore likely to be difficult to drain.



GOOD EXAMPLE OF "V" TYPE DITCH WITH SLOPE SLIGHTLY STEEPER THAN 45 DEGREES

Another example of similar conditions is the marsh-lands along the New Jersey coast, where also differences in elevation are very slight and the water-table high, because of changes of the tide. Under difficult drainage conditions of this kind, control usually resolves itself into ditching and the use of tide-gates for the purpose of concentrating the water, with no actual attempt to secure a complete run-off.

In the delta region at Mound, La., the writer observed that the average grade of the natural watercourses or bayous was one foot to a mile; consequently drainage by ditching, if attempted, would necessarily be a precise engineering problem. Moreover, conditions in Louisiana are more or less similar to those in the tropics, for there are distinct wet and dry seasons. Ditches must therefore be so constructed as to produce a rapid run-off during the heavy and extended rains. Another example of slightly different conditions is found in the Department of Rivas in Nicaragua close to the shore of Lake Nicaragua. This territory is exceedingly malarious. The soil has a fairly rapid run-off and a fair rate of absorption, but has poor natural drainage because of the topography and the dense vegetation.

The facts governing ditching for malaria control may be presented in tabular form:

I. Country
  - Temperate
  - Semi-tropical
  - Tropical

II. Rainfall
  - Maximum precipitation yearly
  - Maximum precipitation monthly
  - Maximum precipitation in twenty-four hours

III. Nature of Terrain
  - Elevation above sea-level
  - Porosity of soil
  - Vegetation

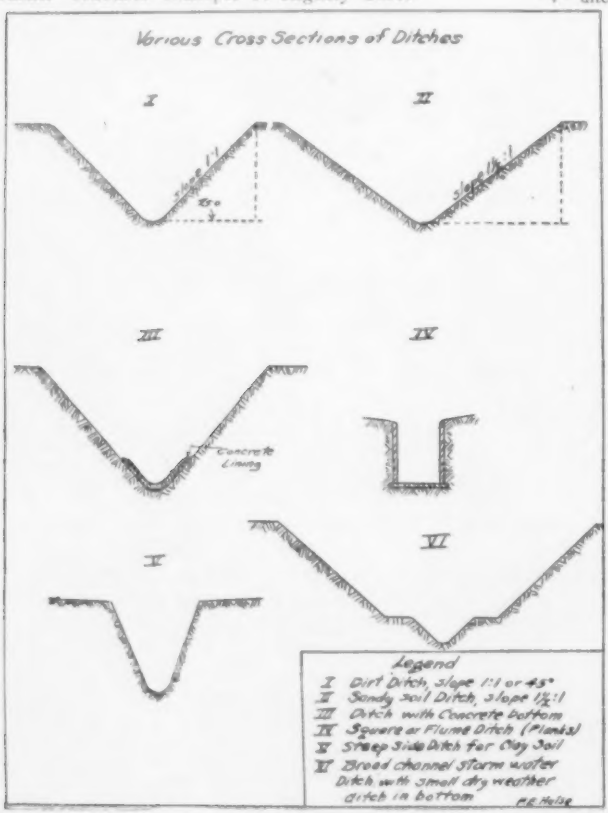
IV. Limitation of Funds Available

The following are the types of ditches that may be employed:

I. Concrete Ditches
  - Half-round
  - "V" ditch
  - Flume or square ditch

II. Open Dirt Channel Ditches
  - "V" type ditch
  - Broad channel with small "V" type in the bottom for varied flow
  - Combination of the two above
  - Straight side ditches for clay soil and sandstone

III. Other Forms
  - Brick
  - Stone
  - Wooden



The following are the types of ditches for various conditions in the order of their length of life:

I. Low, flat land with high water-table and relatively poor soil absorption
  - a. Concrete "V" type or half-round type. Ex. Canal Zone Panama, Le Prince
  - b. "V" type, dirt sides, slope 45°

II. Same as I, but in a sandy soil
  - a. Concrete "V" type or half-round type with wing-walls and weep-Holes. Ex. Le Prince, Canal Zone, Panama
  - b. "V" type natural open-channel slope, 1½ or 2 on 1

III. Country with slight difference in elevation, but heavy precipitation, soil porous or wet
  - a. Broad channel with small "V" type or half-round type in bottom, of concrete
  - b. Same as a, but of dirt

IV. Country with good fall, soil sandy, heavy rains (Tropics)
   a. Broad channels, frequent wing-walls to prevent wash, and "V" type channel in bottom of broad channel
V. Same as IV, with firm soil and average rainfall
   a. Open-channel ditch of concrete or dirt of strictly "V" type, slope 45°
VI. Flat country, firm soil, clay or "gumbo," with average rainfall (Louisiana)
   a. Concrete "V" or half-round types
   b. Small "V" type ditch with slope 45°
   c. Open channel flume or square type

A few of the points to watch in the construction of ditches or in rechanneling natural stream courses are these:

1. Have ditch as straight as possible; the fewer bends the better.
2. Bends should not be at right angles, but over 130° to prevent undercutting of banks.
3. Where bends must be more abrupt, use baffle-boards or widen the channel to reduce the current.
4. Avoid too sudden a change in grade, to prevent gouging of the channel bottom.
5. In sandy soil and on steep slopes use wing-walls to prevent side wash of sand into the ditch.
6. Passing through culverts and under bridges, widen the channel at the approach, to reduce the velocity of the current.
7. Laterals should not enter the main ditch at right angles to main ditch, but on a large bend or an acute angle pointing in the direction of flow. In case a lateral enters the main ditch above the grade of the main ditch, a stone fill is necessary in the channel of the main ditch to prevent scouring at the point of discharge. This stone fill is necessary in some cases in the channel of the ditch at the point of a sudden drop in grade, to prevent scouring. Also a stone ramp or fill is necessary at the down-stream end of culverts and small bridges where the channel is narrowed, thus increasing the velocity and possibly causing a scouring of the channel.

Hints on Ditch Construction

To increase the velocity of a stream.—There are numerous means by which the velocity of a stream may be increased: for example, make the ditch narrower at the point where the increased velocity is desired, either in the original construction or by a plank wall on either side of the channel and filled behind; increase the grade or slope of the channel; or make the sides of the ditch more nearly perpendicular. The last-named method can only be employed where the nature of the soil will permit.

To decrease the velocity of a stream.—This may be done by reducing the grade of the channel or by widening the ditch at the desired point, and in some instances by the use of baffles in the stream channel itself. Unless this latter method is applied with caution and only after some study, scouring and undercutting of the banks may result.

Maintenance of permanent grade.—In open dirt ditches a very good method of retaining the original grade is to drive stout flat-topped stakes into the bottom of the channel at intervals of ten or twelve feet, the tops of the stakes to be level with the bottom of the channel. In case the ditch fills with sand, it is a comparatively simple process to dig down to one of these stakes and thus find the grade, then follow along to the next stake, and so on. Where open ditches are necessary on account of limited funds, this method will effect considerable saving in the cost of maintenance.

Some methods of filling.—The use of stone with gravel firmly packed and then cemented with a thin coat of neat cement is an ideal method. Where cement is not available, clay may be used effectively to fill the voids of the cracked stone. In Nicaragua, where the soil is loose and shifting, the writer found that driving a large number of stakes to grade into the bed of the stream and then filling with cracked stone, the whole covered with earth and packed down firmly, resulted in a very good fill.

Lignite Replaces High-Grade Coal in Municipal Power-Plant

Use of Low-Grade Fuel Made Possible by Mechanical Stokers

ADJACENT to the power-plant of the water and light plant, Moorhead, Minn., are beds of lignite and other low-grade coals. In spite of the proximity of these fuels, the plant was burning Pocahontas mine-run under its 200-horse-power Stirling boiler because no effective means of making use of the low-grade fuel had been found by the management, without endangering the plant's ability to give uninterrupted service such as a power-station of this type must give.

After considerable investigation it was decided that these fuels could be efficiently

burned on underfeed stokers. This led to the installation of two Jones "Standard" stokers which are similar to types which have been used elsewhere for burning high-ash, low-volatile coals with relatively high efficiency, high capacities and continuous operation. The stokers were immediately started, using Wilton, North Dakota, lignite, a coal with a B.T.U. of only 6596 as fired. A series of three tests was made to determine the efficiency of the stoker and boiler at regular loads, heavy loads, and capacity. The results are shown below in tabular form. The tests determined that there was an efficiency of 65.9 at regular load, and 64.5 at heavy overload. In the capacity test 296.7 boiler horse-power was developed in the 200-horse-power boilers, giving 148.4 per cent of rated capacity.

After this combination had been in operation for over two years, tests showed that the plant gave 20 per cent maximum capacity over the boiler rating with 65 to 70 per cent efficiency, the draft pressure being ¾-inch water. The installation of the stoker had cut the cost of fuel $1 per ton, equal to 40 per cent in cost, through the use of a lower grade.

Results of Boiler Test

Coal Burned: Wilton, Dakota, Lignite

	At Regular Load	Under Heavy Load	Capacity Test
Coal burned per hour as fired....lbs.	1061	1734	2533
Coal burned per hour per retort....lbs	531	867	1267
Water evaporated from and at 212° per hour....lbs.	5246	8007	10237
Water evaporated from and at 212° per sq. ft. of heating surface per hour....lbs.	.....	.....	.....
Boiler h.p. developed (average)....b.h.p.	152.1	232.1	296.7
Per cent of rated capacity developed....per cent	76.1	116.1	148.4
Water evaporated actual per pound coal as fired....lbs.	4.59	4.27	3.71
Water evaporated from and at 212° F. per pound of coal as fired....lbs.	4.94	4.62	4.05
Water evaporated from and at 212° F. per pound of coal dry....lbs.	7.37	6.88	6.03
Water evaporated from and at 212° F. per pound of coal combustible....lbs.	8.22	7.67	6.72
Efficiency of boiler, furnace and grate....per cent	68.9	64.5	56.5

A Discussion of Stokers

To the Editor of The American City:

I want to ask for a limited space in The American City for a review of the article, "Hand Versus Mechanical Handling of Coal and Ashes," by W. F. Schaphorst, M. E., in October, 1921, and continued in the November number. I have been familiar with the various types and forms of stokers in use for forty years.

The author's contribution to the subjects treated is not without merit. There are, however, some quite confidently made assertions which are misleading. For instance, stipulation No. 2, page 324, of advantages of stoker over hand fire, says in part: "It is independent of the physical ability of the mental attitude of the fireman or his assistants." This sounds like a copy from a stoker-promotion circular. There are at least five distinctly different types of stokers, and three or more different makes of each type, with the operation of which I am quite familiar. I have never yet seen or known a stoker that is independent of intelligent supervision to secure good results, even in a single-boiler plant, much less in a 5,000- or 7,000-h.p. plant. Moreover, on page 327, in the fourth of his stipulations of disadvantages, the author flatly contradicts himself as follows: "The mechanical stoker requires human attention." I should say, intelligent supervision.

No person should be deceived in reference to necessary attendance even with use of the best form of automatic boiler furnace, nor should any believe that best hand firing on tests can equal best operation of best completely automatic furnace, much less in regular daily or average work.

There is "no such animal" as a municipal or other plant too small for advantageous use of a stoker, especially one of the over-feed type, the "Coal Feeder," which is the only type of stoker that can be properly designated as an "over-feed." It scatters the coal over the fuel bed on a flat grate.

Just why a stoker is not as advisable in a small municipal plant as in a non-municipal plant is not stated.

Mr. Schaphorst does not seem to be familiar with under-feed stokers, as he has asserted that "no stoker made can take

care of all grades of coal." It is, as he says, not only "almost impossible," but it is altogether impossible "to prevent some waste of unburned fuel" in the ashes, but it is possible to have as clean ash from a good automatic furnace as from any hand fire work. I quite agree that human attention is necessary, but the over-feed "Coal Feeder" referred to herewith will soon save cost of installation, and up-keep too, in any plant, even in a one-boiler plant.

The fuel economy advantages of stoker firing are obviously just as great proportionately in a small as in a large plant.

The Boston engineer's report and other cited tests of saving of stoker over hand fire are not phenomenal. There are scores of plants where the saving of fuel by use of automatic furnace amounts to 15 to 25 per cent or more, as shown on the monthly book accounts of fuel bills.

Among the "disadvantages" stated on page 327 is the following: "Generally stokers should not be installed unless it is also decided to handle ashes and coal automatically."

There are at least three times as many plants where stokers or "automatic" furnaces are in paying use without mechanical handling of ashes as where ash-handling systems are used, and at least twice as many plants equipped with what he erroneously calls "over-feed" or "opposed-feed" stokers, where neither coal- nor ash-handling is used, as where either is in use, and, when the stoker is properly operated, there has been no need of extra "manual labor" nor "mechanical agitators" to avoid clogging of coal in the feed opening or magazines.

Mr. Schaphorst's description of the form and operation of what he calls over-feed stokers is a mixture of error about two distinctly different types, viz., front-feed and side-feed types. They are different in construction form, in operation and in results. He says over-feeds are more liable to smoke. The front-feed is, but the side-feed has no equal for continuous smokeless combustion, nor for economy of fuel and for crowding capacity, and this form has no dump grate, but is continually and efficiently kept clear of clogging by clinker and other refuse.

In the operation of what he designates as the "opposed feed type," it feeds from both sides, but rotatively from one side and then the other, instead of "simultaneously," and the coal does not "rest, for a short time" on plates "where the volatile gases are driven off." The plates referred to as "coking plates" are the bed-plates of the coal magazines. The coal is not coked until after it is pushed off these plates onto the grate. If coking took place sooner, it would be destructive of the adjacent parts of the magazine. There is no "lower end" to this form of furnace; exhaust steam is showered underneath the grates to prevent clinker from running or sticking to the grates, and incidentally it prolongs the life of the grates, which are the only parts in contact with the fire.

I do not care to note the statements about chain grate type nor "under-feed stokers," except to call attention to the evident attempt to make a virtue out of the necessity for carrying heavy fires, which is true of all fires driven by a blast, and to correct the error about higher temperatures. There is no possible higher boiler furnace temperature in an under-feed than in the side-feed automatic furnace, except that from lack of suitable suction draft there may be a cumulative heat effect, which is destructive of furnace walls.

O. D. COTTON,
Dayton, Ohio.

Our Schools Should Be Health Builders

We believe that our schools have met with a fair measure of success in inspiring moral living. We have assumed that children may and do improve in their study of arithmetic, geography, writing and reading. There is a general consensus of opinion, however, that our experiments in building healthy boys and girls have had few tangible and worthy results. We have never really expected that children would graduate from school in as good or better condition than when they entered. At the end of each year we have expected rather that they would be in a run-down condition. It is time we began seriously to consider the means whereby boys and girls will improve in health whenever it is necessary, in the same way that they improve in drawing or geography.

DR. J. MACE ANDRESS,
U. S. Bureau of Education.

Experience with Bituminous Gravel Streets

Methods of Constructing and Maintaining Streets in Richmond, Indiana

By D. B. Davis
City Civil Engineer, Richmond, Ind.

(EDITORIAL NOTE: *The following article came to* THE AMERICAN CITY *as a letter inspired by the article by Harrison L. House which appeared in the January, 1922, issue under the title, "Reinforcing Gravel Roads for Motor Traffic."*)

WHEN the streets of Richmond, Ind., were originally improved, the great local abundance of gravel led to the decision to use that material for the roadways. The gravel was laid to a depth of 12 inches. Cobblestone gutters were laid at the same time and were later replaced by a combined cement curb and gutter. Partly because of a slight difference in elevation of the outer edge of the new gutter and partly on account of the natural wear during a period of some 20 years, these streets became very flat, necessitating resurfacing.

It was the practice of the city to handle this resurfacing with crushed stone at its own expense, but in 1918, because of increase in the price of stone and in freight rates, resurfacing with that material became prohibitive, and, not wishing to discontinue the repair of streets, we decided to return to the use of gravel and to continue the same methods that were used for macadam.

The gravel used was from the city pit and gave approximately the following screen test:

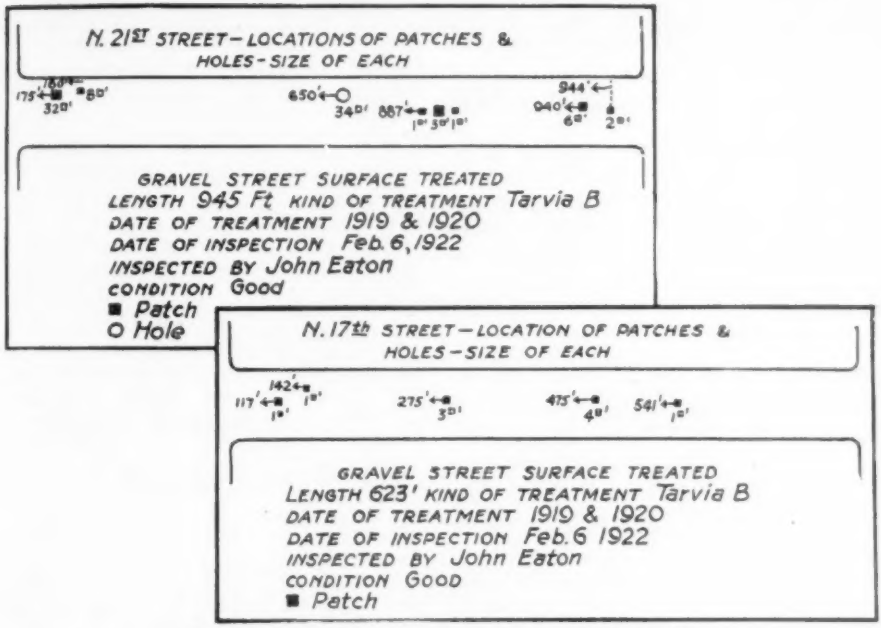
Passing a screen	Retained on screen	
1½-inch		100.0%
1½-inch	¾-inch	11.7%
¾-inch	½-inch	6.7%
½-inch	¼-inch	16.9%
¼-inch	⅛-inch	17.3%
⅛-inch	50	29.4%
50		4.7%
Clay content		13.3%

The clay appears as a coating on the pebbles and not as lumps in the mixture.

The following methods were used in constructing the gravel surface: The old worn gravel surface was first loosened to a depth of 3 inches by a scarifier attached to a 10-ton roller. The new bank-run gravel was spread in one course to a depth of from 4 to 5 inches. A finished crown of about ½-inch to the foot was attained. After thorough harrowing, the gravel was dampened and rolled. After once setting it with the roller, it was then more thoroughly wet and rolled to a finish. On the final rolling the surface was brushed by a steel brush attached to the roller; this was instrumental in filling the voids of the larger aggregate and giving the surface a smooth pebble-dash finish.

NORTH 21ST STREET, A BITUMINOUS GRAVEL ROAD IN RICHMOND, IND.

In 1919, it was determined to experiment with Tarvia B surface treatments on these gravel streets. North 21st Street and North 17th Street, comprising about 550 square yards, were the first ones treated. The success attained on these streets resulted in treating others each year,


N. 21ST STREET—LOCATIONS OF PATCHES & HOLES—SIZE OF EACH
GRAVEL STREET SURFACE TREATED
LENGTH 945 Ft KIND OF TREATMENT Tarvia B
DATE OF TREATMENT 1919 & 1920
DATE OF INSPECTION Feb. 6, 1922
INSPECTED BY John Eaton
CONDITION Good
■ Patch
O Hole
N. 17th STREET—LOCATION OF PATCHES & HOLES—SIZE OF EACH
GRAVEL STREET SURFACE TREATED
LENGTH 623' KIND OF TREATMENT Tarvia B
DATE OF TREATMENT 1919 & 1920
DATE OF INSPECTION Feb. 6 1922
INSPECTED BY John Eaton
CONDITION GOOD
■ Patch

PRINTS SHOWING RECORDS OF STREET INSPECTIONS

until at present there is a total of 50,000 square yards.

For successful results it has been our experience that the gravel surface must be hard and comparatively smooth prior to the application of the surface treatment. The application of these treatments the next season after construction allows traffic to more thoroughly compact the original surface. If small depressions are present at the time of treating, they are repaired by filling with ¾-inch stone, tamping it about 3/16-inch below the street surface and sealing with hot Tarvia X. If there is dust on the surface, it can be removed to the gutter with a rotary sweeper. Otherwise, good results have been obtained by applying the material directly to the gravel.

The original bituminous material was applied cold by means of a pressure distributor. For the initial treatment, ⅓- to ½-gallon per square yard was used, with subsequent treatments of ⅓- to ¼-gallon per square yard. After the initial treatment, when traffic has used the street for some months, a few depressions may develop, due either to an excess of dust or to a damp, clayey spot on the surface prior to the application of the binder. These are of little consequence, but must be repaired before the second application of the binder next season. It is absolutely necessary that a second treatment be applied the next season, and if it is doubtful whether this can be done, it is not advisable to apply any surface treatments whatsoever on gravel.

Maintenance Charts

The accompanying charts show the maintenance required on North 21st and North 17th Streets, respectively, during the three years since 1919. No treatments will be necessary for these streets in 1922. After two successive applications of the original binder, additional treatment has been found unnecessary for from two to three years.

Richmond, Ind., has a population of about 27,000, and the gravel streets treated are those which are closely built up and are representative of the average residential cross-streets and not the thoroughfares.

The cost of resurfacing with gravel at present prices is approximately as follows:

	per cu. yd.
Cost of bank-run gravel at the pit	.35
Hauling by teams, 6 loads per day, 1½ yds. per load, team at 65 cents per hour	.72
Spreading on street at 40 cents per hour	.13
Extra man at pit loading at 40 cents per hour	.13
Cost of gravel on street	$1.33
	per sq. yd.
Gravel delivered and spread at $1.33	.29
5-inch finished depth req. 22 cubic yards scarifying and rolling with roller	.06
Cost of resurfacing	.35

The binder is applied by the city forces on petition by the people who reside on the street. A table of estimates is prepared and kept on file in the engineer's office giving the estimated cost of applying the binder to each block of gravel and macadam in the city. This table of estimates shows the width and length of each individual city block, together with the rate of cost per lineal foot and the total cost to the property owners for each block. This amount must be deposited with the city before any work is started. In order to encourage the property owners to have the streets treated, the city has agreed to pay one-third of the total cost and all of the cost of intersections.

The following table gives the engineer's estimate for the initial treatment with binder, using one application of ¼-gallon per square yard:

0.005 cu. yds. pea gravel covering at $1.50 per cu. yd.	0.007
Binder f.o.b. track at 13 cents per gallon	0.033
Cleaning and application	0.015
Estimate per square yard	0.055

Catch-Basin Cleaning in Akron, Ohio

The Cost of Sanitary Cleaning Methods Greatly Reduced

EARLY in 1918 the city of Akron, Ohio, put into commission a machine of the hydraulic ejector type mounted on a 5-ton truck for cleaning its catch-basins. This Otterson Auto-Eductor cleaned 1,044 basins in the first seven months it was used. The average size of the basins was 4 x 5 feet x 7 feet deep, and inasmuch as many of the basins had not been cleaned for several years, they were filled up with dirt, and some of them even had grass growing on the surface.

In 1921, another Otterson two-stage Eductor, mounted on a Mack 5-ton chassis, was purchased. The table below gives interesting comparative figures on the cost of cleaning the basins, the average being $2.94 per basin in 1921, as against $3.50 per basin in 1918. These figures, which include the pay-roll, materials used, interest on investment, depreciation and overhead charges, are far below the cost of cleaning by hand, which averages $5.00 per basin exclusive of cartage.

CLEANING CATCH-BASINS

STREET CLEANING, 1921

	No. 72 Kelly 5 T. Chassis Otterson Eductor 1918 Model		No. 64 Mack 5 T. Chassis Otterson 2 Stage Eductor 1921 Model	
PERFORMANCE:				
Number of Days Operated	63		192	
Number of Hours Operated	710		1,580	
Number of Catch-Basins Cleaned	873		2,322	
Dirt Removed—Cubic Yards	854		2,299	
COSTS:				
Driver—Wages	$1,100.50		$1,200.70	
Helpers—Wages	above		2,342.14	
Gas and Oil	303.00		549.23	
Total Operating		$1,403.50		$4,092.07
Repairs—Wages	100.15		382.24	
Repairs—Parts	522.11		359.73	
Total Maintenance		622.26		741.97
Tire Cost				
Depreciation @ 5 Years			1,237.60	
Depreciation @ Actual Life, 3 Yrs.	820.00			
Interest	129.00		343.79	
Total Capital Charges		949.00		1,581.39
Total Cost		2,974.76		6,415.43
UNITS:				
Cost Per Catch-Basin		3.41		2.76
Cost per Cu. Yd. Removed		3.48		2.79
Cu. Yds. Dirt Per Catch-Basin		0.98		0.99
Catch-Basins Per Hour		1.23		1.47

Total Cost of Cleaning 3195 Basins $9,390.19
Cost Per Basin 2.94
Allowances of Supervision and Garage Rental not included.

Municipal Water Rates—Part I

A Thorough Analysis of Present Rates and Rate-Making

By E. E. Bankson, D. E. Davis and C. A. Finley*

THE development of scientific rate-making has followed the advent of the public service commission, which deals principally with the relatively small privately owned plants susceptible to considerations in operation which are often entirely submerged and of little importance in the operation of the much larger municipally owned plants. This paper is presented with the view of creating further interest in this much-neglected field.

The operation of a municipally owned plant affords the opportunity for rate-making on the basis of true equity, free from temptations to adopt policies of financial expediency appealing to privately owned plants. There are many elements in common to both plants creating influences in rate-making which are often reflected in widely varying results, due to the radical differences between the policy adopted by the directors of a private corporation and that followed by the legislators of a municipality.

The operation of privately owned plants in many states is under the jurisdiction of the public service commission, which permits a revenue sufficient to provide a fair return on the fair value of the property, in addition to operating expenses and an allowance for depreciation of plant. The reasonableness of rates imposed by a private water company would necessarily be measured by application of the rulings of the public service commission.

The operation of municipally owned plants is generally not under the control of the public service commission, which fact admits that different principles are to be applied in the two cases. The duty of the commission is to protect the interests both of the consumers, as members of the community, and of the water company, as a private concern; but the consumers may exercise their control of a municipally owned plant through the power of their vote.

A municipality may operate its water plant at a profit as a separate source of municipal revenue if it is disposed to do so and the law does not prevent. Such operation may favor the property owner who does not take water in proportion to the value of his property, such as vacant property or the extremely valuable property requiring a small quantity of water. On the other hand, if the plant be operated at a loss with the deficiency repaired from the general tax levy, the water taker or consumer as such would then be favored at the expense of the taxpayer.

An opportunity for variation in municipal rates arises under the question as to the so-called ownership of a municipal plant, depending on the proportion of the investment contributed by property through tax assessments as contrasted to excess earnings gathered from water revenue and invested in plant. The reader will here understand that this expression of so-called ownership is used as a convenient term to indicate the source of money that built the plant. Unless this factor is recognized in the building of the rate schedule, some discrimination may result towards one or the other of the contributors of the plant cost, that is, the property owner on the one side or the water consumer as such on the other side, and the equity of rates imposed by a municipal plant would seem to depend on this seat of so-called ownership.

A municipality may operate its water plant at a profit as a separate source of municipal revenue if it is disposed to do so and the law does not prevent. Such operation may favor the property owner who does not take water in proportion to the value of his property, such as vacant property or the extremely valuable property requiring a small quantity of water. On the other hand, if the plant be operated at a loss with the

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deficiency repaired from the general tax levy, the water taker or consumer as such would then be favored at the expense of the taxpayer.

The thought often exists in the minds of the layman that substantial justice will be done if all revenue is derived from water sales, since the consumer and the property owner are substantially one and the same. That this is not strictly true is evident when considering the extreme cases such as the valuable vacant property or the large office building which enjoys water service, fire protection, and increased property value out of all proportion to the relatively small charges for water used. This case shows a wide contrast with that of the very large consumer of water whose business is housed within a relatively inexpensive building or property.

The decision to operate a municipal plant at a profit, or at a loss, is, however, to be determined in part by administrative policy rather than entirely by scientific rate-making, but if accurate cost analysis is to play any part in the problem of rate-making, it must precede and remain separate from questions of administrative policy, except that the term "cost of service" may be subject to different interpretations according to the administrative policy obtaining, the purpose of cost analysis being to indicate or mould the correct administrative policy in this respect. Since the major purpose of this discussion is to determine "total cost of service" resulting in the "rate base," or the total "annual burden" and the equitable distribution of this burden to the various consumers of a municipally owned water plant, any mention of administrative policy in connection with cost is offered only as contributory.

Cost of Service

Cost of water service as deduced from the practice of public utility commissions in their control of privately owned plants is made up as follows:

(A) Fair return on a fair plant value
(B) An allowance for plant depreciation
(C) Cost of plant operating and maintenance

wherein the items for "fair return" cover any profit permitted for the utility, and all three items are based on used and useful plant value.

This discussion of the absolute cost of service rendered by a municipal water plant will not involve an item of profit, and consequently the item of "fair return" for a private plant will be replaced by an item which may be designated as interest on capital invested. As the so-called ownership of plant, bonded indebtedness, sinking fund, and interest rate paid may vary with each plant, it follows that the total cost of service will vary with each municipal plant, though the terms "depreciation and operation" carry the same meaning as indicated above, and this "cost of service" as distributed to the consumers through the medium of the rates charged will be further dealt with under the heading "Distribution of the Burden."

Ownership of Plant

There is no contention that the city does not own the plant, but there does appear to be a difference in equitable rates, dependent on the sources of funds for plant purchase, these being the general tax levy on the one hand, and the charges for water service on the other hand, as illustrated in the following comparisons.

The water-works plant of the city of Toronto, Canada, appears to be bonded to more than its present value, and that of Akron, Ohio, only slightly less, as indicated in the tabulation on "Plant Statistics," which means in a sense that the bondholders own the plant, and the cost of service must incorporate the total interest on the bonded debt, and unless the water revenue provides also a sinking fund for retirement of bonds, the water-takers as such will never hold any equity in plant account. If the operating revenue, in this case, should provide a sinking fund in addition to interest and operating costs, the rates would ordinarily need to be as high as, or higher than, those permitted for a private plant.

The water-works plant of the city of Erie, for the purposes of this discussion, may be considered free of debt, and since there are no interest or sinking fund charges to meet, one might easily and erroneously conclude that the water rates in Erie should be very much less than in Toronto. But such is not necessarily the case, for the reason that the water rates in Erie provide the only source of revenue for plant extension and replacements. In other words, the water-takers in Erie are paying for their plant as they go along, and for the past ten years this cost has been approximately equal to

6 per cent on the plant cost. This item, therefore, takes the place of interest and sinking fund for a bonded plant in the "cost of service" for Erie. If Erie should ever stop growing, however, and no further plant extensions be necessary, this item would disappear from the "cost of service" and the water rates should decrease accordingly, whereupon the advantage of this position would be more apparent. From the above discussion, it is evident that the water-takers have provided the funds for investment cost of the Erie plant, and in the spirit of this discussion we could say that the water-takers or consumers own the Erie plant.

The water revenue in many other cases is insufficient to carry the annual burden, and any bonds retired would indicate a credit to the general tax levy, which should entitle the tax levy to the regular city interest rate on all plant investment actually made, and in setting up the "cost of service" the general tax levy should receive a ledger credit for providing these funds, resulting in a corresponding charge to the water-takers which would appear in the "cost of service" distributed to the individual water accounts through the rates applied, public service and fire protection carrying a proper portion of the cost.

We understand that the present policy in the city of Cleveland is that the ownership of small distributing street mains and service lines to the curb is vested in the property owner, or he foots the bill and carries that entire burden by direct assessment, as for sewers or street paving, while in the city of Erie that total burden is carried by the Water Department, thereby creating a difference in the basis for equitable rates in the two cases. In the one case the consumer has gone down into his pocket and paid outright for his service line and street main, or, if a renter, he meets that burden through his house rent, while in the other case the burden of the items appears in the water rates, corresponding to return on investment, this variation resulting from the different location or seat of plant ownership of the items in question.

The city of Pittsburgh offers a third comparison in this respect, where the property owner assumes the burden of the service line and the Water Department the service mains. Or, again, a difference as to ownership of meters offers yet another comparison. The purpose of the foregoing comparisons is to support the statement that the rates charged for water in one city are no evidence of equitable rates to be charged in another city or in a private plant, but each case must be analyzed separately and stand on its own merits under the full conditions obtaining.

Again, in support of the thought that each schedule of rates stands alone, we tabulate deductions from replies to questionnaires sent to several cities. This tabulation indicates among other things that the bonded debt and resulting fixed charges vary from 0 to 100 per cent, that the plant value varies from $19.75 to $88 per capita, and that the operating cost varies from $0.92 to $3.22 per capita, or from $18 to $95 per million gallons.

Another deduction from this table is that an average plant value is slightly less than $40 per capita, while the average operating cost for 1919 was slightly less than $40 per million gallons, although this figure would be reduced in normal times.

It is entirely possible that there may be some discrepancies in interpretation of both questions and answers preliminary to the formation of this table, which would give erroneous results, but we have no evidence of error in the figures submitted and here use them as illustrative of this position. The results should remove any thought that water rates in different cities can be compared, because a comparison in total means nothing.

Service Rendered

The function of a water-works plant is admittedly two-fold—that of furnishing a water-supply for general consumption and for fire protection—and since this discussion is based on the principle that "the rates charged for any service should be in proportion to the cost of such service," it becomes necessary to make a careful analysis of all functions and duties assumed by the water department and of all service rendered.

Fire protection service is rendered to property or to property owners in proportion to the value of the property protected, and charges should be entered directly against the property or against the general tax levy. General water service is rendered to persons or industries largely in proportion to the water delivery, with no necessary

WATER PLANT STATISTICS FOR 1919–1920.

CITY	Population	Plant Value	Bonds Outstanding	Plant Value per Cap.	Operating Cost	Operat. Cost per Capita	Number Consumers'	Operat. Cost per Cons.	Mill. Gal. Daily.	Operat. Cost per Mil. Gal.
Cleveland	990,000	$28,000,000	12,000,000	$28.39	$953,936	$0.97	108,702	$8.75	127	$20.50
Toledo	260,000	12,500,000	1,915,000	48.00	382,335	1.47	45,500	8.40	28	37.30
Buffalo	510,000	19,198,490	12,847,492	37.60	890,948	1.74	76,258	11.70	136	18.00
Akron	160,000	10,000,000	9,000,000	62.50	267,000	1.67	32,000	8.35	20	36.50
Milwaukee	500,000	10,000,000	195,000	20.00	458,973	.92	66,422	6.92	61.9	20.40
St. Paul	250,000	7,443,707	2,407,000	29.75	247,722	.99	46,000	5.40	17.6	38.60
Youngstown	132,000	2,610,887	763,200	19.75	276,294	2.09	21,169	13.16	12	63.00
Toronto	499,276	16,000,000	16,209,316	32.00	1,150,599	2.30	104,766	11.00	75	42.00
Syracuse	171,000	15,000,000	4,105,000	88.00	249,395	1.45	25,450	10.00	27.5	25.00
Detroit	1,108,735	23,583,428	2,855,114	21.20	1,159,333	1.05	164,779	7.00	152	21.00
Sandusky	30,000	.....	.....	.....	60,615	2.00	5,600	10.70	4	41.50
Indianapolis	267,000	10,000,000	Private	37.50	.....	.....	46,080	.....	20	.....
Albany	112,568	3,099,000	1,520,850	27.50	360,100	3.22	20,674	17.50	20	49.30
Rochester	295,850	13,800,000	10,445,000	46.70	867,000	2.92	49,484	17.50	25	95.00
Canton	90,000	3,000,000	1,500,000	33.30	.....	.....	22,000	.....	13	.....
Pittsburgh	547,000	32,000,000	10,698,392	58.50	1,422,762	2.60	91,617	15.50	118.4	32.80
Duluth	98,000	3,650,776	2,424,000	37.20	98,587	1.00	13,401	7.35	9	30.00
Erie	110,000	3,755,000	.....	34.10	310,000	2.80	19,000	16.30	20.4	41.60
Minneapolis	300,000	11,000,000	1,750,000	36.70	.....	.....	61,000	.....	27.5	.....
Williamsport	45,000	1,600,000	Private	35.50	77,141	1.71	11,000	7.00	8.5	24.86
Totals	6,476,429	$226,241,288	$90,635,364	$734.19	$9,232,740	$30.90	1,030,902	$182.47	931.8	$637.36
Average	.....	.....	.....	$38.60	.....	$1.82	.....	$10.70	.....	$37.50

relation between value of property and quantity of water delivered; therefore, to make a proper accounting for all service rendered, the charge for water cannot properly cover fire protection, for there is no necessary relation between the two, and in fairness to all concerned, a charge for fire protection must appear separate in a complete set-up for equitable rates.

Providing a water-supply for fire protection service creates an increase in plant investment and in plant operation over and above the cost which would be sufficient for general water service. The exact cost of fire protection service has been somewhat in doubt within the limits of the two methods of competition used, that is, the excess method and the proportional method, but after a careful analysis has been made of the fire protection service rendered by any plant, a cost for this service can with fairness be established and a charge indicated. In the case of the city of Pittsburgh, the ratio chargeable to each service was obtained from available records of actual demands, and the result was fairly checked by the equation proposed by Metcalf, Kuichling and Hawley in the 1911 Proceedings of the American Water Works Association.

General water service may first be separated into two groups, as public service and private service. If the tax levy carries the burden of plant investment, this may amount to more than the cost of the public service received by the city and by property in general, in which case the ledger should

(This discussion of the making of meter rates will be continued in the April and May issues.)

A Chance for National Economy

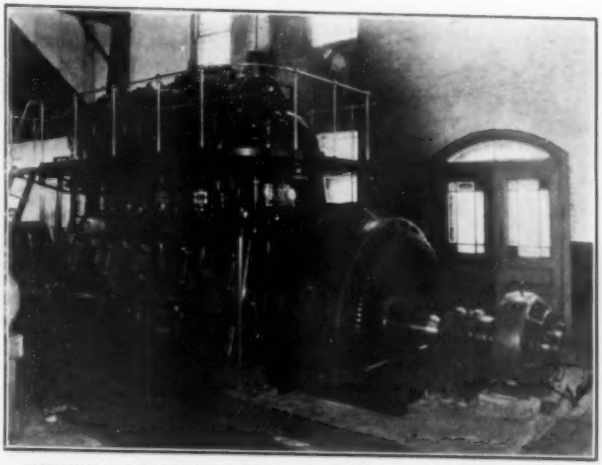
Business and financial leaders are telling the public to stop waste, and to work and save in order to restore sound conditions. The public could make a good beginning by stopping the preventable fire waste of the country, which is estimated to have amounted to $500,000,000 last year, or approximately $1,370,000 a day. Carelessness and ignorance normally figure as the chief causes of our fires, but there is also the mistaken belief of many that when property is insured against fire the insurance companies are the only ones to worry if it burns. As a matter of fact, insurance costs are so closely interwoven with our social and economic fabric that we are all affected by the fire waste.

The careless or ignorant citizen responsible for a fire taxes himself as well as his fellows.

Diesel Engine in Light and Water Works in Freeport, N. Y.

By Stanley Wright

THE village of Freeport made its original water-works installation in 1894. This equipment sufficed until about 1898, when electric lighting equipment was added consisting of two 70-horse-power return tubular boilers, two 50-arc-light machines, and one 37½-k.w., A C. generator. Since 1898, additions have been made to the plant continually, so that in 1920, when the population of the town was about 12,000, the power-house contained the following units: four 200-horse-power boilers, one 300-k.w. generator direct-connected to a Hewes & Phillips single-cylinder Corliss engine, one 200-k.w. generator belted to a single-cylinder Fishkill Corliss engine, and one 100-k.w. generator belted to a single-cylinder Fishkill Corliss engine, totaling 600 k.w. in maximum capacity; the generators being all alternating current, 1,150-volt, 3-phase, 60-cycle machines. The steam pumping equipment consisted of two one-half-million direct-acting Worthington steam pumps.



INTERIOR OF FREEPORT, L. I., POWER-PLANT, SHOWING DIESEL ENGINE INSTALLATION

In 1920 the load was running approximately as follows: during the day an average of about 200 k.w.; during the evening about 500 k.w. when both street lights and domestic lights were on; and about 160 k.w. after midnight when the principal load was street lights alone. This street lighting is with arc lamps in the usual series system, requiring constant current transformers at the power-plant to regulate the voltage in accordance with the number of lamps in use, so that the same current is always maintained. These arc lamps as they become worn out are being replaced by nitrogen-filled incandescent lamps.

The water pumping in 1920 averaged 500,000 gallons per 24 hours, which is lower than for the average town of this size, and is accounted for by the fact that there are several independent wells scattered about the town from which many families obtain their supply.

The power-house is next to the railroad, about a half-mile west of the station, close to the wells from which the city water is drawn, and a 293,760-gallon stand-pipe is located next to the power-house and directly connected to the mains, so that the pumps work against an average head of 155 feet, which is the approximate level of water maintained. The village fire department owns both steam and motor fire engines, so that in case of fire the pressure from the mains is supplemented by that of the fire apparatus.

The Need for New Equipment

In 1920 the electric rates for house lighting were on a flat basis of 10 cents per kilowatt hour, street lighting being paid for by taxation. During the summer of 1920 it was becoming evident that additional power equipment would have to be installed because the load had increased to a point where during the evening peak all the units in the plant were running at full capacity

and there was nothing in reserve. A study of this increase in load since 1898 showed the interesting fact that the demand for electricity had practically doubled itself every four years, and during 1920 was increasing at a still faster rate. It became imperative to have additional generating equipment as soon as possible, so the Village Trustees immediately began an investigation to ascertain what type of new equipment would be best to install for their conditions.

The Diesel engine had been suggested, but at first there was some skepticism concerning the feasibility of putting in such a machine to run in conjunction with existing steam equipment. After very careful investigation extending over a period of two or three months, supplemented by personal visits to some Diesel installations, the Board became convinced that it would be the most advantageous thing to do. It was found that a new Diesel engine generating unit could readily be placed in the existing power-house without an addition to the building; that it would operate in parallel with the existing steam engines; and from the Board's inspection of other Diesel plants they felt sure that considerable savings could be made over "all steam" operation.

The Board purchased a 365-b.h.p. vertical, 4-cylinder Busch-Sulzer engine with a 250-k.w. direct-connected General Electric alternator. The installation was completed in the spring of 1921, including a 45-foot overhead hand travelling crane of 10-ton capacity; also, a panel was added to the switchboard, and the arc-light transformers were transferred to a platform especially constructed in the engine-room.

Since the new unit was put in regular service it has been running on a 24-hour schedule, including Sundays. In general, the engine is run two weeks without a stop, and some longer runs of thirty full days have been made. It is of special interest to note that since the Diesel engine has been installed it has been operated fully 95 per cent of the total elapsed time, including Sundays and holidays. In other words, instead of keeping the Diesel unit to carry over peak loads and for emergency, the steam equipment is kept for this purpose, and the Diesel grinds away on steady load both day and night.

The savings over previous operation by steam alone are greater than had been anticipated, and the records show that the new unit has been giving Freeport a net saving of over a thousand dollars for every month, compared with the previous cost of current generated by steam alone. The two direct-acting steam pumps are now being replaced by 40-horse-power and 60-horse-power Alberger centrifugal pumps with G. E. motors.

Operation of the Engine

The engine-generator unit forms a complete power-plant in itself on a single foundation. Aside from its economy of operation, this type of prime mover is advantageous in requiring no boilers or boiler-room equipment, nor the building space and labor for it. Moreover, it is clean, compact, readily accessible, and has no standby losses. The same operators who take care of the steam engine take care of the Diesel, so no additional labor is required.

The fuel oil storage capacity consists of one 10,000-gallon and one 12,000-gallon underground tank, located just west of the plant and on a railroad siding. At these tanks there is a motor-driven pump, also an emergency steam pump for transferring the oil to the engine-room auxiliary tank. The pipe in which this oil is transferred is laid in a small trench, concreted and covered, in which there is also laid a steam line so that in extremely cold weather it can be kept sufficiently warm to prevent any stoppage of fuel due to congealing from low temperature. The motor-driven pump is controlled by a small switch in the engine-room on the wall beneath the auxiliary tank, so that as soon as this tank is filled the operator cuts off the motor. From the auxiliary tank in the engine-room the fuel flows by gravity to the pump on the engine, and from there it is delivered to the fuel valve of each cylinder. As the fuel valves open, a blast of air from the compressor forces the fuel through the atomizers into the cylinders. In full Diesel engines pure air only is compressed, and by compression becomes sufficiently hot to burn the finely divided fuel as it is forced into the cylinder by the air blast, incidentally eliminating any electrical ignition system or other ignition device. To start the engine there are provided two starting air tanks, in which air is kept stored at high pressure at all times. The air for fuel injection, which must necessarily be at a higher pressure than the

PLANT OPERATING RECORD
VILLAGE OF FREEPORT, LONG ISLAND, NEW YORK

1921	KWH Generated in Month Diesel	Steam	Total	Fuel Consumption Gallons Oil—Diesel	Pounds Coal—Steam	Diesel Oil @ 7c.	Fuel Cost Steam—Coal @ $8.35 per 2240 lbs.	Total Cost for all Steam Operation —Basis 5.53 Lbs. Coal Per KWH. (economy of previous all steam plant)	Net Saving Per Month
June	91,070	27,317	118,387	10,068	288,126	$700	$1074	$1774	$2440	$666
July	94,610	30,981	125,591	10,242	278,946	717	1040	1757	2590	833
August	107,430	35,680	143,110	11,513	324,440	806	1210	2016	2950	934
September	110,320	45,321	155,641	11,480	338,472	804	1263	2067	3210	1143
October	112,700	81,139	193,839	11,898	503,460	832	1875	2707	3990	1283
November	123,500	85,888	209,388	12,916	495,072	903	1845	2748	4320	1572
December	128,050	112,997	241,047	13,190	569,664	923	2122	3045	4970	1925

compression in the cylinder, is furnished by a three-stage air compressor directly driven from the main crank-shaft of the Diesel engine.

The system of lubrication on the Freeport engine is one deserving of close attention; all engineers know that this feature is of the highest importance for the successful and continuous operation of any engine. Most of the troubles with Diesel engines of earlier design can be traced directly or indirectly to faulty lubrication. On the engine at Freeport there is provided a completely enclosed forced feed system in which the oil is circulated under regulated pressure to all the main bearings, crank pins and piston pins. After leaving these points it drains from the engine bed plate through a two-way filter, and after passing through the cooler located under the filters is again pumped into the system. Oil for the pistons is provided by forced feed mechanical lubricator, the distributing lines feeding oil to six points on the circumference. The cam shaft is entirely housed in, and the cams dip in an oil bath.

Courtesy Electrical Merchandising

TWO DANGERS TO HIGHWAY TRAVEL AT NIGHT—THE BLINDING HEADLIGHT AND THE ONE-LIGHT CAR

Proper highway lighting would eliminate both dangers, not to mention others

Suggested Ordinances for Interim Zoning

By Edward M. Bassett
Counsel, Zoning Committee of New York

AFTER the Legislature had empowered New York to establish zoning regulations, and a commission had been appointed, insistent requests came from many localities to protect them pending the preparation and adoption of the all-city plan. Private one-family dwelling restrictions in Fiske Terrace expired January 1, 1916, and this locality petitioned the Zoning Commission for immediate protection against stores. The Commission refused, because such piecemeal zoning treated certain selected land preferentially and was therefore dangerous, because it might have started zoning with a critical lawsuit, and because first one locality and then another might be thus protected and withdraw its assistance from the comprehensive plan. Before the zoning resolution went into effect on July 25, 1916, a row of brick stores was erected, injuring Fiske Terrace somewhat. If, however, piecemeal ordinances had been passed for this and other petitioning localities, the comprehensive plan would have been delayed and perhaps defeated.

Although one may not recommend any method of preliminary zoning, one may perhaps point out the line of least danger. Piecemeal zoning should be avoided. Interim zoning of a comprehensive or all-city sort is safer. Here is an example:

"Wherever four-fifths of the frontage of the lots on any street between two intersecting streets contain at the time of the passage of this ordinance structures exclusively residential, no structure shall be built or altered for business or factory purposes therein."

Such an ordinance is at least comprehensive. It covers the whole city and after a fashion treats all alike who are similarly situated. If the Legislature has given the city the power of zoning, the courts would be quite likely to uphold such an ordinance, except perhaps in some particular case of extreme hardship. It has the demerit that all preliminary and quickly written zoning ordinances must have—it is arbitrary. The matured zoning maps will recognize the different needs of different residential streets and will take away nine-tenths of the arbitrariness.

The suggested form can be altered as regards the fraction, the present use, and the prohibited use. It may be adapted to set-backs. It is merely to illustrate the direction of safety. The provision fixing the status of the protected district as of the time of the ordinance prevents what may be called traveling districts or set-backs. Most interim ordinances have allowed the district to be altered by the erection of new buildings or the destruction of old ones. This transitory application of the police power has undoubtedly affected adversely the views of the courts in some cases.

There is always a temptation to make an interim ordinance adaptable to each locality by introducing a majority consent. Here is an illustration:

"Wherever four-fifths of the frontage of the lots on any street between two intersecting streets contain at the time of the passage of this ordinance structures exclusively residential, before a permit shall issue for any building or alteration for business or factory purposes therein there shall be on file with the building commission the written consent of the owners of three-fourths of the entire frontage."

Such a provision is ineffective and the courts will set it aside. Police power regulations are governmental and not like contracts between persons. Majority consents of owners cannot give an official the power to regulate. The local legislature must do the prohibiting.

The United States Supreme Court has, however, declared that, if the police power regulation prohibits the objectionable structure, a provision for a majority consent to make an exception does not invalidate the ordinance. The following ordinance is submitted as comparatively safe:

"Wherever four-fifths of the frontage of the lots on any street between two intersecting streets contain at the time of the passage of this ordinance structures exclusively residential, no structure shall be built or altered for business or factory purposes therein, unless the written consent of the owners of three-fourths of the entire frontage shall be on file with the building commissioner at the time of the issue of a permit."

An interim ordinance should always refer to the zoning enabling act in its preamble.

Insuring the Maximum Life of Block Pavements

By A. J. Moynihan

THERE are millions of yards of blocks laid each year, and in the construction of block pavements, whether granite, wood, or brick, one feature which always demands the most careful consideration is the filling of the joints. Filling the joints either adds to or detracts from the average life of the pavement. The completed pavement will give results in proportion to the type of filler and the method of application; therefore, as much care should be exercised in the selection of the filler as is taken in the selection of the blocks.

The consensus of opinion among engineers and road builders is in favor of the so-called flexible fillers. The reason for this is that the filler must be of such a nature as to allow for expansion and contraction of the blocks due to climatic and temperature changes and to moisture. Experience has demonstrated that a properly prepared asphalt is one of the best fillers; however, the mere fact that a flexible filler is specified does not mean that the problem of filling the joints is solved, as there are characteristics which the filler itself must possess, as well as provisions which should be included in the detailed construction specifications for the proper methods of application.

In order to secure most satisfactory results, the filler must be of relatively high melting-point, adhesive, and malleable; a product which will not soften materially when subjected to high temperatures nor become brittle at low temperatures. It must be wear-resisting and impervious to water and street liquids. An asphalt filler of this nature properly applied at a temperature of between 350° and 425° F. by a combination of the poured and squeegee methods for granite block because of their depth, and by the squeegee method alone for brick and wood block, will insure long life to the pavement.

In applying the asphalt filler, the filler gang should follow the pavers as close as possible, and in no case should they leave the pavement over night without completely

APPLYING A FLUSH COAT TO GRANITE BLOCK PAVEMENT ON SECOND STREET, CINCINNATI, OHIO

The flush coat consisted of equal parts of Texaco asphalt and sand by volume

THE FINISHED PAVEMENT ON SECOND STREET, CINCINNATI, OHIO

On this job the joints in the granite block pavement were three-quarters filled with pebbles and asphalt. The work was finished with a mastic flush coat, which filled the joints and left a thin protective mat on top of the block

filling the joints. In case of rain, the pavement should be covered with tarpaulins so as to keep water out of the joints before application of the filler, as it is essential to have the joints dry and clean before pouring the asphalt.

Methods of Filling Joints

Granite block.—Clean, dry pebbles passing a ½-inch screen and retained on a 3/16-inch screen are hand-swept into the joints. The blocks are then rolled with a tandem roller (either 8- or 10-ton) so that the pebbles are shaken to thoroughly key the blocks, leaving the joints about two-thirds filled. The asphalt filler is then poured into the joints until the voids in the pebbles are completely filled and the asphalt is within an inch of the top of the blocks. A flush coat made up of equal parts, by volume, of clean, dry, fine sand and asphalt agitated so as to be thoroughly mixed, is floated over the entire surface of the pavement, completely filling the joints, leaving a light coat of the mix on top of the blocks. A ¼-inch covering of dry pebbles, passing a ¼-inch and retained on an ⅛-inch screen, is then evenly applied over the surface. The completed pavement can be opened to traffic immediately.

Brick.—After the brick have been thoroughly rolled, they should be swept clean by hand brooming. The joints should be completely filled with an asphaltic filler applied by the squeegee method. In floating the asphalt over the surface of the brick, sufficient material is allowed to remain on the brick so as to form a carpet coat. A covering of dry, coarse sand is then evenly applied over the entire surface.

Wood block.—Best results are obtained by floating the asphaltic filler on the surface of the blocks, squeegeeing back and forth until the joints are completely filled. A covering of clean, fine, dry sand is then evenly applied over the surface.

Preparing the Filler

There are many details which should not be overlooked in preparing a flexible filler for application. One of the most important features is the heating. The material should be heated at a uniform rate; upon reaching the temperature where best results can be obtained, between 350° and 425° F., depending on the season of the year, the filler should be applied as soon as possible. When it is necessary to hold for any length of time material which has been heated in the kettle, the fire should be banked and the material agitated from time to time so that there will be no danger of coking or overheating, as this tends to harden the material. The heating kettle should be fitted with a thermometer, so that uniform heating is as-

sured and the material is applied at the proper temperature.

To properly charge a kettle, the asphalt, which is shipped in drums or barrels, should be quartered and placed in the kettle so as to half fill it. A slow fire is then started. As soon as the asphalt is melted sufficiently to cover the entire surface of the bottom of the kettle, the fire can be gradually increased and the kettle completely filled. The filler should be agitated at regular intervals throughout the heating to avoid burning.

Many users fill a cold kettle with material and then fire it as hard as possible in order to melt the filler quickly. This is very bad practice, as it will warp the kettle and ruin it in a very short time.

The kettle should be kept clean from carbon and sand which collects on the bottom; otherwise this crust acts as an insulator, confining the heat, rendering it difficult to melt the asphalt, and causing the bottom of the kettle to burn out, greatly shortening the life of even the best kettles.

The Value of an Efficient Fire-Fighting Organization

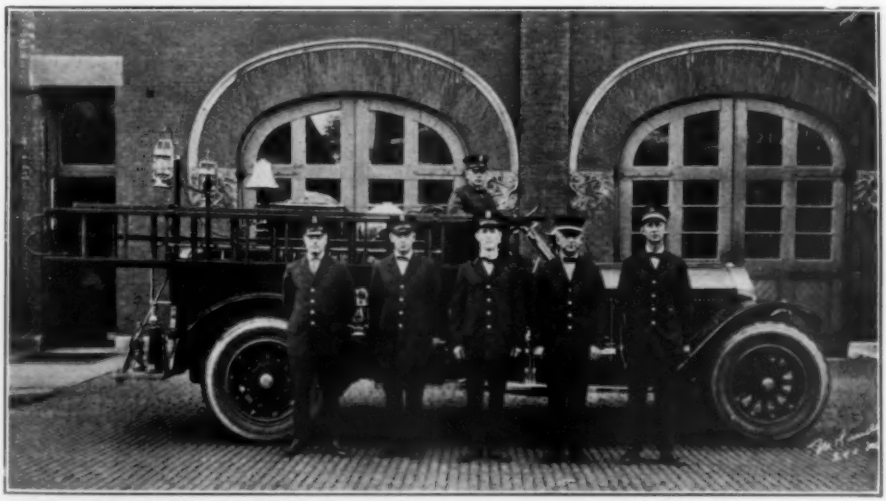
Training and Organization of Dubuque, Iowa, Fire Department Greatly Reduces Annual Fire Loss

By L. J. Jellison
Dubuque, Iowa

WITH a population of 42,000 and a fire department which has been practically reorganized within the last twenty months, Dubuque has held its fire loss down to $75.72 per fire for the last year. The fire department records show the following data for the years 1916-1920:

	No. of Fires	Loss	Average Loss Each Fire
1916.....	220	$642,000	$2,918
1917.....	226	226,000	1,000
1918.....	258	55,000	213
1919.....	311	374,000	1,203
1920.....	82	502,813	1,735

In January, 1921, the city, operating



A CRACK COMPANY OF THE DUBUQUE FIRE DEPARTMENT WITH ITS AMERICAN-LA FRANCE MACHINE

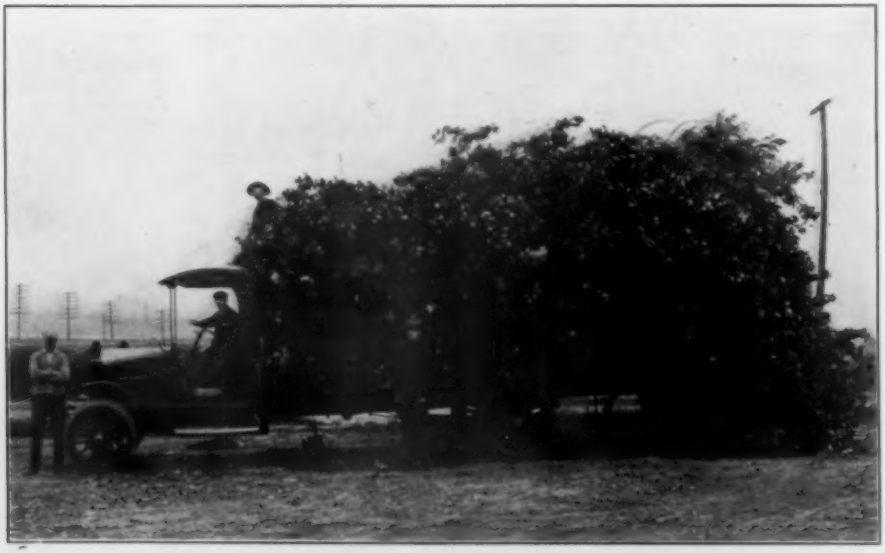
under the city manager form of government, placed an experienced fire fighter in charge of the department. Chief Joseph Fisher's records for the period March, 1921, to December 1, 1921, showed 240 fires, total loss $18,173; average loss per fire $75.72. This record indicates a potential saving in fire loss, basing the deduction on the losses in previous years, amounting to $373,507.20 for eight months, or $560,260.38 for twelve.

The Reorganization

Before the advent of Chief Fisher, the Dubuque Fire Department was completely motorized, yet it was inadequate, for the want of trained men to handle the equipment. There were ten pieces of apparatus, with two men, not counting the officers, to each machine. The first thing that the new chief did was to ask for more men, and twenty new men were added to the force. Then the department was reorganized, and men who had served between 20 and 32 years were asked to resign and were placed upon the pension roll.

A training course was instituted, including ladder climbing, laying hose, spotting pumpers at hydrants, ladder raising, and carrying of hose. Each company was brought down to headquarters daily to train. And then, in order to increase the interest of the men in their work, intercompany contests were held. The various companies reached such a degree of efficiency that it was decided to hold a public demonstration and contest. Business men offered trophies for the winners of various contests, such as making a long run, coupling to a hydrant, laying 200 feet of hose and throwing water, also ladder climbing and hose coupling.

The training of the men included mental as well as physical exercise. An athletic director was appointed, and certain periods of the day were given over to wrestling, boxing and bag punching. A school was organized and lectures were given by captains and other officers of the various companies. Mondays and Tuesdays were devoted to examinations, and the men were given written tests on the location of hydrants, prominent buildings, elevators, fire-escapes and exits of various buildings, fire alarm boxes, sprinkler alarms, etc. The city was divided into districts, and a test was given on each district. That Dubuque has definitely proved that efficiency in a fire department, coupled with thorough inspection by uniformed members of the force, is well worth while, is demonstrated by its fire loss of only $75.72 per fire since the reorganization of the Fire Department.



HOW SOME PARK DEPARTMENTS ARE REPLACING DECAYING TREES AND THUS PRESERVING THE BEAUTY OF THE PARK AREA

Fraser Town—A Plague-proof Town in India

Sanitary Improvements at the Civil and Military Station of Bangalore in the Mysore Province, South India

By J. H. Stephens
Engineer, Bangalore, India

IT was in 1898 that plague first broke out in Blackpully, India, in its most virulent form. It afterwards continued in a milder degree, making its unwelcome presence felt every cold season, when it claimed the most victims. The construction of Fraser Town—a plague-proof town—was not sanctioned till the beginning of 1906. This interval of eight years was not lost. The plague was carefully watched year by year and its peculiarities were studied. Nearly every plague-infected house was minutely inspected, and an intelligent reason ascertained as to why the plague had afflicted that house in preference to those around it, and thus this vile pestilence betrayed itself and it became possible to adopt rules for its permanent exclusion.

A GENERAL VIEW OF A CONGESTED INDIAN CITY WITH CLOSELY ABUTTING HOUSES

The scenes of sorrow and distress one witnessed when inspecting the plague-infected houses are indescribable. The more ignorant class thought that the English were working a kind of spell upon them, for while so many Mohammedans died, the plague hardly touched the English. It took some time for these people to understand that the principal cause of all the trouble was insanitary habits and manner of living. The uneducated Hindu mind is very superstitious. Evil and good spirits enter into all his social and domestic relationships. It was therefore necessary to assure him that the Plague Demon and the other demons of Hindu diseases would be effectually excluded from this new town in which he was invited to locate. The plague has not been an unmixed evil. It has shaken the faith of the people in the protecting and purifying efficacy of rites and sacrifices, and prepared them for the gospel of fresh air and sanitation.

A little consideration of ancient Hindu town planning and town building will show how great was the spell of superstition

BLOCKS OF BUILDINGS UNDER CONSTRUCTION IN FRASER TOWN

which obscured the naturally acute Indian mind, and the ancient nature of the covering made it all the more sacred and secure and difficult to remove. Ancient Hindu town planning and town building are found in old mutilated manuscripts, difficult to decipher and hard to explain, except by learned pundits. They were said to contain revelations made by the deities at different times to Rishis, or holy men who lived in the earliest days.

Except for the small minority of the educated classes, India was very much as it was centuries ago. Rites and sacrifices were still considered the purifiers of a town, and impure and filthy surroundings were contemplated with passive calmness as almost a necessary part of existence. Any change was looked upon as an unhealthful break of old traditions. Till the plague came! This dreadful experience convinced the Hindus as nothing else could have done. They saw that the English people living in their new town, but under better sanitary conditions, were almost untouched by the plague, while Indians died in thousands, so the more wealthy who could afford it rushed off to live in the English sections of the town. There was nothing in the rules of the land to prevent their doing so. It was only their caste prejudices which kept the Indians together, but the law of self-preservation was found to be stronger than the law of caste. Thus the plague was not only a teacher, but a reformer.

The Plan of Fraser Town

The relief of congestion in the Indian sections of Bangalore could not be started till accommodation was found for the evicted people in some other locality. About 50 acres of high agricultural land about 1½ miles north of Blackpully were acquired for building about 500 houses, most of which were intended for the poorer classes. The site was well chosen, it was well drained with falls of about 1 in 75, so that the drains would have self-cleaning slopes, and it was higher than most other parts of Bangalore. It was bounded by the railway on the north and by important public roads on the other three sides. The soil consisted of red loam for the upper 2 feet and hard gravel beneath. Its greater length faced south, the direction of the prevailing breezes, so that it was a high, well-drained, wind-swept, healthful locality. This tract was broken up into one-acre building blocks by intersecting roads and streets. The main roads were made 99 feet wide; the other roads were 66 feet and the streets 33 feet. Each acre was divided into 20 building sites, and sold under certain conditions and rules. Those who desired it could build a larger house on two plots only. More than two plots was not allowed for one house. This gave 2,178 square feet for the smaller plots, and 4,356 square feet for the larger plots. Of these areas, only one-third was to be built on, and two-thirds was to be kept as an open space all around the building. That is, for the smaller houses 726 square feet would be the area of the building, and 1,452 square feet the open area all around the building; in the larger houses 1,452 square feet would be the area of the building, and 2,904 square feet the open space all around the building. In practice this worked out that the larger houses were at the ends of the block and the smaller houses in the middle, as shown in the photograph of blocks under construction.

The areas for the new buildings were decided on after carefully measuring up the spaces actually occupied by the poor in the congested parts of the town and allowing a certain proportion of increase. There was some difficulty in carrying this out. Some purchasers of plots did not understand why they should not cover the ground entirely with buildings, as used to be done in most other places. They had to be reminded that this was one of the rules on which land was sold to them, and it required great watchfulness to see that the rule was not broken. In modern times, when garden cities are building almost everywhere, with open areas around each house, that which has been described may be considered as ordinary sanitary improvements, but sanitary advances have to be combined with the plague-proof rules to make them effective, as will be described.

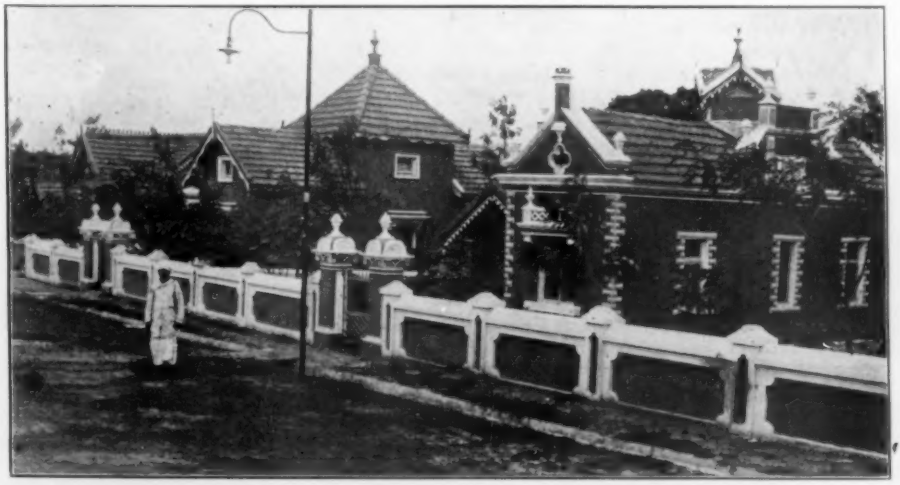
Fleas on dead rats or squirrels convey the plague to man. They are the propagating medium, and not the originating cause of plague. The germinating cause infects the rodent, and the flea from the rodent conveys the disease to man.

The "Plague-proof Rules"

Continuous observation for about seven years connects moisture, stagnation and damp with the originating cause of plague in Bangalore. Therefore, the first and most important plague-proof rule which was to make and keep Fraser Town free from the plague was that it should be free from damp. For this reason all its roads and its streets were countersunk about 1½ feet below the level of the natural ground. This made the one-acre building-blocks like hillocks surrounded by the countersunk roads and streets. Even the natural percolation in the upper soil was cut short at each acre-block by the countersunk roads and street, thus keeping the buildings quite dry even after the heaviest rains. This was the first and most important plague-proof rule.

The second rule extended from the originating cause to the propagating medium. It ordered that the basements of all the houses were to be not less than 1½ feet high and were to be built of coarse granite rubble jointed with good cement. Coarse granite rubble is both plentiful and cheap in Bangalore, so that this rule was no hardship to the builders. Many Indians do not care for high basements, as they destroy that privacy which they consider so important for their women. The plague-proof reason for the stone basements was to prevent the rat from burrowing into the houses; also, it helped in keeping the house dry. An ordinary sanitary improvement and the plague-proof rule in this case ran together.

The third plague-proof rule was that the floors of all the houses should be of stone slabs, or of hard, compressed tiles, so that rats might not burrow holes through the



TWO COMPLETED COTTAGES IN FRASER TOWN, WITH THE OWNER

floor, or vermin of any kind find lodgment in it. This rule many considered a great hardship in houses intended for Indians. The orthodox Hindu had an old-time way of making floors, in which religion was mixed up with a dirty habit. But Fraser Town was to be kept pure by sanitation, and not by old religious rites, and so the stone floors were insisted on—and stone was cheap. These floors contributed to making the houses rat-proof and vermin-proof, and thus plague-proof.

The fourth and last plague-proof rule was that all the roofs should be covered with Mangalore tiles. This is the old Roman interlocking tile. It is water-proof, but not air-proof. All its joints are open. No cement or mortar or nails are needed in its fixing. The air passes freely through the joints and keeps up a continual circulation day and night. The houses are provided with abundant doors, windows and ventilators. Indians have a way of keeping these safely closed, but they cannot close the joints between the tiles, and so circulation goes on continually, and the people are learning to appreciate its value.

It is now about twelve years since Fraser Town was erected as a plague-proof town. Sir Harcourt Butler, the then head of the Sanitary Department for all India, said at the first All-India Sanitary Conference, "Fraser Town is the only plague-proof town in all India." Many from other places in India wished to know how this was done, and explanations were given. The good people who built the houses in Fraser Town were principally Indians. It was brave of them to risk their money in building on these new and untried rules. It has turned out a great financial success. Whenever there is a plague anywhere around, people flock to Fraser Town as to a city of refuge, and it has not disappointed them. What is perhaps also very important is that the poorer class of Indians are being taught a new manner of living. The children are strong and healthy. Each one has his own little yard to play in and appreciates it; it is not now necessary to play in the gutter.

After a trial of 12 years, Fraser Town has passed the period of apprenticeship. There should now be no going back to the old Indian method of erecting abutting buildings with no voids between. This is an ordinary sanitary improvement known all over the world, and land is comparatively cheap in Bangalore. The plague-proof rules supply a special want, and should be observed in all plague-infected countries, though they also help in improved sanitation and may be adopted in a modified form to suit special places where new towns are projected.

Port Development

NEARLY all the large cities of this country are located on navigable waterways, many of them being situated on deep estuaries leading direct to the ocean. The World War resulted in the creation of a great international trade between this and foreign countries. To maintain this trade successfully in competition with other countries, it is necessary that the most modern facilities for handling and shipping goods shall be provided. Port authorities in every city on the Atlantic, Pacific and Gulf Coasts, and on our Great Lakes, anxious to share in this foreign trade, have been actively engaged during the past few years in developing their terminal facilities and are now planning greater extensions to handle the additional waterborne cargoes. In order that a port may compete in the world trade, it is essential that provision shall be made in the planning of the city for the great trunk railroads to reach the water-front, either directly or over a belt line railroad system, so that the cars may deliver cargo at the ship's side. It is also necessary that a system of traffic streets shall be laid out and developed in the rear of the piers and along the water-front, to give highway facilities for motor trucks and vehicles to make deliveries to and from the industries, warehouses, and stores located in the vicinity of the water terminal.

The authority to plan and administer the ports of this country is vested generally in the officials of the city, although there are several instances where ports are under the control of state commissions; but in all cases the development of the land side of the port is a proper task for men skilled in both city planning and other municipal work.—"Municipal Engineering," George S. Webster. Trans. Am. Soc. C. E., 1921, page 516.

Forward Steps in Municipal Affairs

Police Departments

The Duties of a "City Mother"

Los Angeles, Calif.—After many years of experience in police and juvenile work, the writer conceived the idea of a confidential office located away from the depressing atmosphere of Police Headquarters, where troubled parents might come for advice and assistance in the management of children who were beyond their control, thus saving to society many children who might become a menace or a burden.

The title "City Mother" has inspired confidence in the hearts not only of parents but of boys and girls as well, who might, through reticence or fear, remain away from the Police Station proper. While the officers of the City Mothers' Bureau have police authority, they refrain from using it except when absolutely necessary. They try through love, sympathy, encouragement, and personal interest to teach children their duty to parents and to society, and by this same method to awaken parents to their duty and responsibility.

The City Mothers have found that, by gaining the confidence and holding the interest of boys and girls until they have reached the age of discretion, they usually become good citizens. By this method many very serious cases are uncovered which probably never would have been brought to the attention of the Police Department.

Many parents seem to be asleep to the dangers which surround their children. Dangers have multiplied a hundred-fold in the last twenty-five years, owing to the fact that the parents are employed largely outside the home. The multiplied means of easy communication, swift travel and diversified amusements constitute nothing less than menaces to morality.

It has been found that the lack of understanding between the parent and the child is often responsible for children's becoming indifferent to obedience—and disobedience as a rule is the first step to delinquency. There are other cases where the children have gotten beyond the control of the parents before they realize it, and not infrequently have gone astray. Then the distracted parents in desperation reach out for aid, and it is here the City Mothers extend a helping hand and assist in bringing the strayed ones back into the fold.

Another great cause of delinquency is the broken and unprotected home. Recently the City Mothers had occasion to make an investigation and they found the children of an entire community demoralized by a family of children whose parents were employed during the day. This home became the rendezvous of all the children in the neighborhood.

The work of the City Mothers' Bureau is largely preventive, forestalling crime, thereby saving the city annually many hundreds of dollars, besides preserving that which is of far greater value—the morals of our girls and boys. A large number of the cases are reported direct from the schools.

This Bureau has been quite successful as a "Domestic Relations Court," bringing together parents who, by their estrangement, had broken up their homes and placed an additional burden on the community. In cases of failure to provide, a technicality sometimes prevents prosecution, and we are often able to secure the desired results without going into court, frequently bringing about a reconciliation of the parents and reuniting broken homes.

The City Mothers have established a day nursery where working mothers may leave their babies for the small sum of ten cents

per day. There are four trained nurses in charge of this nursery and here an average of fifty children are cared for daily.

The City Mother has two assistants and an advisory board of ten representative women, who have helped to create a fund with which to carry on the work of this Bureau, as there is no appropriation from the city other than the salaries of the office force.

Owing to the growth of the Bureau and the numerous outside interests involved, a legal adviser was appointed by the Mayor over a year ago.

MRS. ALETHA GILBERT,
City Mother.

Recreation Departments

Where Those Who Work Can Play

NEWPORT, R. I.—One of the most difficult things in the world is to maintain a proper balance between work and play—to enable work and play to be seen in their right relation to each other.

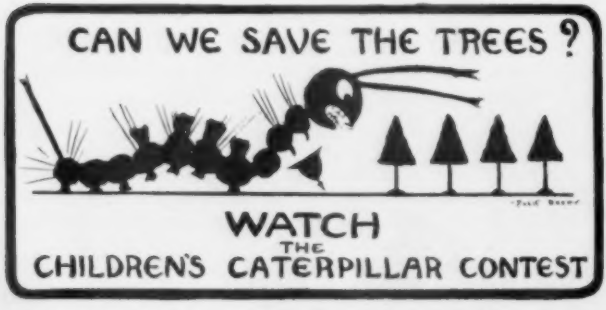
Living, as we do, in the age of machinery and specialized industry, there is little opportunity for seeing adults, especially men, at productive work. The boys see their fathers around home, smoking, reading, or loafing, rather than at work in store or factory. When father comes home, growling about the job, the impression that work is something to be avoided as much as possible becomes fixed in the adolescent mind.

A recreation system where everything to play with is furnished gratis for the asking tends to deepen this impression. Play can best be appreciated when it follows work. A system of recreation will render a great service to its city if, in some way, it can fix in the minds of the boys and girls that only those who work can play, and that no one deserves to play, or can play, unless he works. People come to Newport to play, not to work; therefore, it is especially difficult in this city to glorify work and to impress upon the youthful mind that work is a good thing, and to correlate work and play.

There is much work to be done in the care and maintenance of a playground and ball park, and much of this work can be done by children. Of course, it is a very wonderful idea that they should do it from civic spirit, but after a children's crusade against caterpillars which saved the city's trees and saved the city an immense amount of money, no adequate reward had been received by the children in the form of greatly increased recreation facilities, so that it appeared to the writer that work and play should be harnessed up a little more closely.

A work ticket was printed, which says in large letters, 'Those Who Work Can Play—5 cents," and in small letters, "This can be exchanged for athletic supplies at any sporting goods store in Newport when properly stamped." Those who do work about the playgrounds are paid by means of these tickets as much as it would cost to have the work done by men. We furnish very few athletic supplies, but furnish the opportunity for every team to work and purchase whatever supplies it needs. The plan is resulting very satisfactorily. The continual sight of this motto, "Those who work can play," cannot fail to impress the idea upon the minds of the children. The tickets are all numbered, and a record is kept of the numbers given out to the director of each playground, together with detailed instructions for their disbursement.

It is suggested that a boy or a girl under 10 ought to be worth from 5 to 10 cents per hour, and a boy or a girl from 10 to 14 should be worth



A POSTER USED IN THE NEWPORT, R. I., CHILDREN'S CAMPAIGN AGAINST INSECT PESTS

from 10 to 20 cents an hour, according to his ability. A boy or a girl from 15 to 17 should be worth from 20 to 25 cents an hour, and boys and girls over 17 ought to be worth from 30 to 40 cents an hour, according to ability and application. The director of each playground is to see that he gets his money's worth for tickets issued, and that there is no loafing on the job; he must also be able to explain to the Superintendent of Recreation what was accomplished for the tickets given out. These tickets can be exchanged for athletic supplies at any sporting goods store in Newport, or they will be exchanged, at cost, at the Recreation Office for any supplies in stock.

ARTHUR LELAND,
Recreation Consultant;
Superintendent of Recreation.

Public Welfare Departments

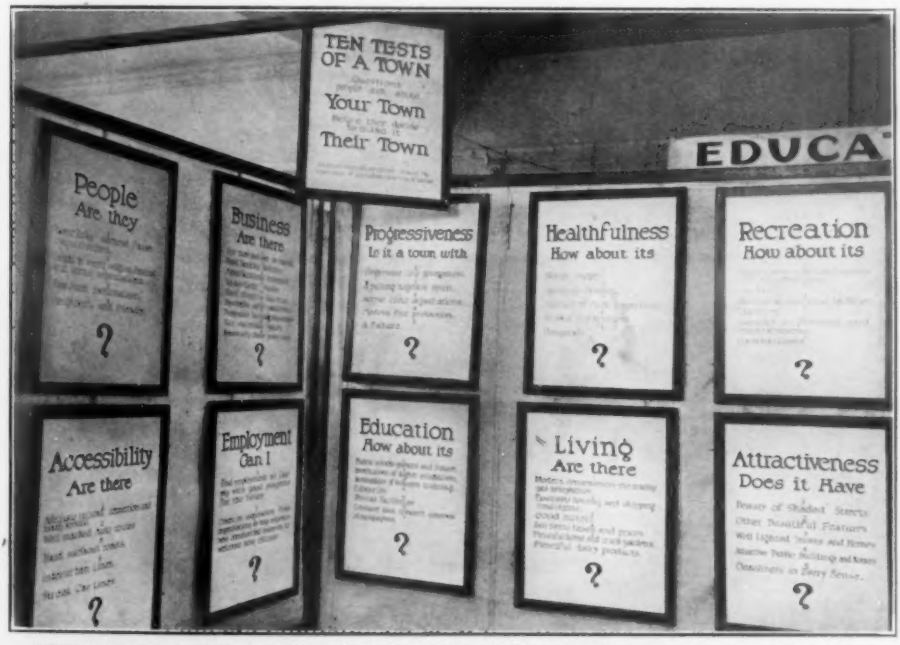
Introducing the Community to the Citizens

BOULDER, COLO.—Know Your Community Week was recently held in Boulder to acquaint the rank and file of the citizens with the social, economic and scenic resources of the community. It was sponsored by the Director of the City Department of Public Welfare, the Commercial Association, and the University Extension Division. Many other agencies and organizations cooperated.

The exhibit was held in a large hall centrally located. Thirty portable canvas booths were furnished by the University Extension Division and were arranged on the one-way plan, so that all visitors entered at one door and passed all the booths before reaching the exit. A brief description of some of the principal sections of the exhibit may be of interest:

1. The Pioneer Section, consisting of exhibits prepared by pioneers of this community and comprising such things as a model of the first schoolhouse built in Boulder; the first melodion; the first chair, and many other items that were the first of their kinds brought to the community. These pioneer exhibits were intensely interesting, not only to the older folks, but also to the younger ones.

2. The Photographic Section, comprising five booths showing exclusively scenic pictures of Boulder and Boulder County.



THESE TESTS WERE APPLIED TO BOULDER, COLO. THEY SUM UP THE ESSENTIAL QUESTIONS ASKED ABOUT ANY TOWN

3. The Public Health Section, dealing with the milk, water and food supplies, as well as giving an analysis of the vital statistics of the community. The data for the vital statistics and some of the other subjects were secured from a social survey just completed by the University Extension Division and the American Red Cross.

4. The Recreation Section, containing among other things a miniature playground illustrative of the type of playground that any community could and should have. This playground had exactly 100 dolls on it. Many of the pieces of apparatus, such as the giant stride, slide, swings, teeters, etc., were operated mechanically.

5. The Education Section, in which the public schools displayed samples of sewing, cooking and manual art work. Many of the visitors had had but little conception of these phases of public school work.

The most convincing evidence of the interest shown in the exhibit is the record of the attendance, which was as follows: first day, 1,187; second day, 1,559; third day, 1,845; fourth day, 3,030; making a total of 7,621 in a community whose population is approximately 11,000.

Meetings so arranged as not to conflict with the exhibit hours were held in the afternoons and evenings. At many of these, illustrated talks were given.

The services of practically all in connection with the exhibit and meetings were given free, but what little expense was necessarily incurred was borne largely by the City Department of Public Welfare.

CHARLES I. MADISON,
University Extension Division, University of Colorado

Park Departments

A Municipal Auto Camp at the Gateway of a National Playground

PUEBLO, COLO.—This city is admirably located to attract the tourist. The Santa Fé Trail passes through it, and it has four other surfaced roadways leading to various other cities, towns and summer resorts in the mountains.

The municipal auto camping ground is located just far enough from the business district to afford it some privacy, and still near enough for the purchase of gasoline, oil, tires, spare parts, groceries and other necessities for the motorists. In the camp is a large, sheltered community stove, for which fuel is furnished free, and also a sanitary building, completely equipped. Abundant water is supplied by the hydrants. No charge of any kind is made to tourists. In the near future it is planned to erect a building and equip it with shower-baths and facilities for washing clothes.

Colorado has the San Isabel National Forest, with its wonderful attractions of climate, mountain scenery, roads and fishing. The forest covers practically the entire mountain range within the state and has many creeks, rivers, lakes, waterfalls and other natural scenic features. A road system is planned to cover the entire area and connect it with state and county highways, making it possible to visit practically every city and town in the state and enjoy the mountain scenery on the way. Much of this roadway is completed and more is under construction.

It is planned to provide means by which ground in the National Forest may be leased from the Government for sites for summer homes. The building of community houses and shelter houses is among other improvements started under the direction of the U. S. Forest Service.

E. E. COLBY,
Superintendent of Parks.

A SANITARY COMFORT STATION, LIKE THE ONE AT PUEBLO, COLO., IS THE FIRST REQUISITE OF A GOOD AUTO CAMP

Health Departments

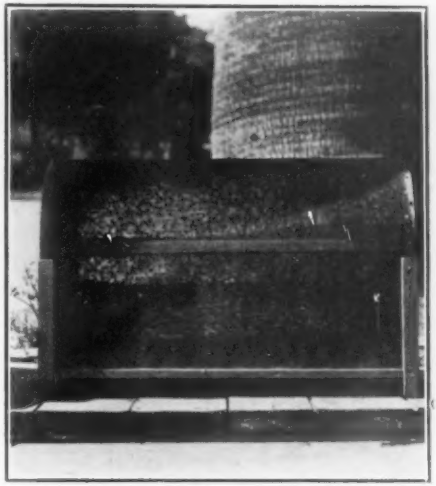
The Work of a Municipal Flycatcher

RIVERSIDE, CALIF.—This city will soon be known as "The Flyless City" if its Municipal Flycatcher continues with his scientific fighting of this pest with trap and spray. Last year E. S. Beebe kept 150 traps, well baited with old bananas, melons, milk, and occasionally old meat, at important centers, collecting in his daily tour of inspection millions of flies. This year he is adding to the trap campaign a daily visit to garbage cans, stables, dairies and such gathering places of these obnoxious pests, where with a spraying machine he dispatches countless hordes. His methods should be of interest to every city.

Mr. Beebe, in behalf of Riverside's Board of Health, uses three sizes of traps, the middle-sized one being the most popular. This is simply a wire cage three feet long by one foot square, raised from the ground about one inch. The bottom is made of wire in the form of a V, with holes in the top of the V through which the flies easily crawl into the trap. All food is placed on the ground or on a board outside, but directly under, the trap; thus the traps are always clean. All traps are placed on the ground, for flies prefer to feed on the ground. After eating, they naturally fly upward into the trap. Mr. Beebe, acting on the fact that flies are much like humans in some ways, places the traps in the shade on hot days and in the sun on cold days. Often requests for traps come to him from garage owners, restaurant keepers, butcher-shop or fruit-stand proprietors, who willingly take care of them and thus extend the scope of the Municipal Flycatcher.

For spraying he uses an ordinary tree sprayer, and the mixture consists of one part creosote to six parts distillate of coal oil. Flies breathe through their bodies, and this mixture kills them instantly. One illustration shows Mr. Beebe spraying a garbage can in an alley. All alleys are systematically visited during the feeding hours, which are early morning and evening. Boxes of refuse, manure piles, oil stations, are also visited daily. Millions of flies are thus destroyed every day during the breeding season. Though the Public Health Board began its fight for a flyless city only last summer, there is a most noticeable diminution of flies in the streets, places of business and private homes.

W. B. WELLS, M. D.,
Health Officer.



A MUNICIPAL FLY-TRAP

ETERNAL VIGILANCE IS THE PRICE OF FLYLESSNESS

Street Cleaning in California

Suiting the Method of Treatment to Street Mileage and Surface

A SURVEY of the street cleaning methods of eighteen California communities shows that while some flushing is done, the pick-up type of sweeper is the principal piece of motor-driven apparatus used. More than half of these communities have not yet made use of motor-propelled street cleaning apparatus. White wings still predominate as a means of cleaning pavements.

The following statistics were furnished by municipal officials in the various cities mentioned:

Alhambra has 55 miles of paved streets, chiefly oiled macadam, averaging 30 feet in width. For cleaning, 5 white wings are employed and 1 horse-drawn sweeper.

Anaheim, with 8 miles of 42-foot sheet asphalt, employs 2 white wings for gutter cleaning and 1 Elgin sweeper and 1 motor-driven flusher to keep its broad avenues in good condition.

Berkeley, with 20 miles of paved streets, and 160 miles of oiled macadam on asphaltic concrete base with an average width of 36 feet, employs 40 white wings and 1 Elgin sweeper to cover the entire city.

Chico, with only 5 miles of asphalt surfacing on a concrete base, and with streets averaging 70 feet in width, employs 3 horse-drawn sprinklers and 1 horse-drawn flusher.

Corona, having 35 miles of 30- to 80-foot width macadam, has 2 white wings, 2 horse-drawn sprinklers, 1 horse-drawn sweeper, and 1 motor-sweeper to maintain its pavements in a cleanly condition.

Colton, with only 3 miles of paved 54-foot cement concrete road, cleans its streets solely by hand and employs 1 horse-drawn sprinkler to keep down the dust.

Eureka, with 8 miles of bituminous pavements from 36 to 51 feet in width, has 1 motor-driven flusher.

Modesto, with 19 miles of asphaltic concrete roads of 40-foot width, relies chiefly on flushing and 3 white wings, 3 horse-drawn sprinklers, and 1 horse-drawn flusher.

Oxnard, with 9 miles of Warrenite paving 80 feet wide, employs from 4 to 8 white wings, 2 horse-drawn sprinklers, and 1 horse-drawn sweeper.

Redding has 40 miles of 56-foot asphaltic concrete roads and relies solely on its motor-sweeper for handling the street cleaning problem.

San Diego has 80 miles of 80-foot concrete road, which is kept clean by 12 white wings and 1 Elgin pick-up sweeper.

Santa Barbara has 45 miles of 60-foot asphalt paving on a concrete base and uses 8 white wings, 2 motor sprinklers and 2 machine sweepers which are drawn by Fordson tractors.

Santa Monica.—The 20 miles of asphaltic concrete paving averages 52 feet in width and is cleaned by 6 white wings.

Santa Maria has 4 miles of macadam and concrete streets, averaging 88 feet in width, and uses 1 horse-drawn sprinkler and 1 horse-drawn sweeper.

San José, having 30 miles of asphalt paving averaging 50 feet in width, employs 20 white wings, 2 horse-drawn sweepers, and 1 horse-drawn flusher.

Stockton, with 130 miles of asphalt pavement, averaging 60 to 80 feet in width, maintains 80 white wings, 10 horse-drawn sprinklers, 2 horse-drawn sweepers and 4 horse-drawn flushers, motor-driven apparatus being entirely absent.

San Bernandino has 30 miles of concrete and Warrenite paving, averaging 48½ feet in width. The street cleaning force consists of 3 white wings, 3 horse-drawn sprinklers, 1 horse-drawn sweeper and 1 horse-drawn flusher.

Vallejo, with 25 miles of asphalt paving on a concrete base, averaging 32 to 40 feet in width, has 5 white wings and 1 Elgin pick-up sweeper.

A Glance Ahead

The matter of sewage disposal is one of the most important ones in connection with the maintenance of public sanitary conditions at every summer resort. Unfortunately, in a great number of instances the reputation of particular localities has been ruined by the serious results that have followed lack of education concerning this important detail in modern sanitation.—*Public Health*, State Department of Health, Lansing, Mich.

Sewage Disposal by Fine Screening at Bridgeport, Conn.

Installation of Riensch-Wurl Screens Prepares Sewage for Ultimate Disposal by Dilution

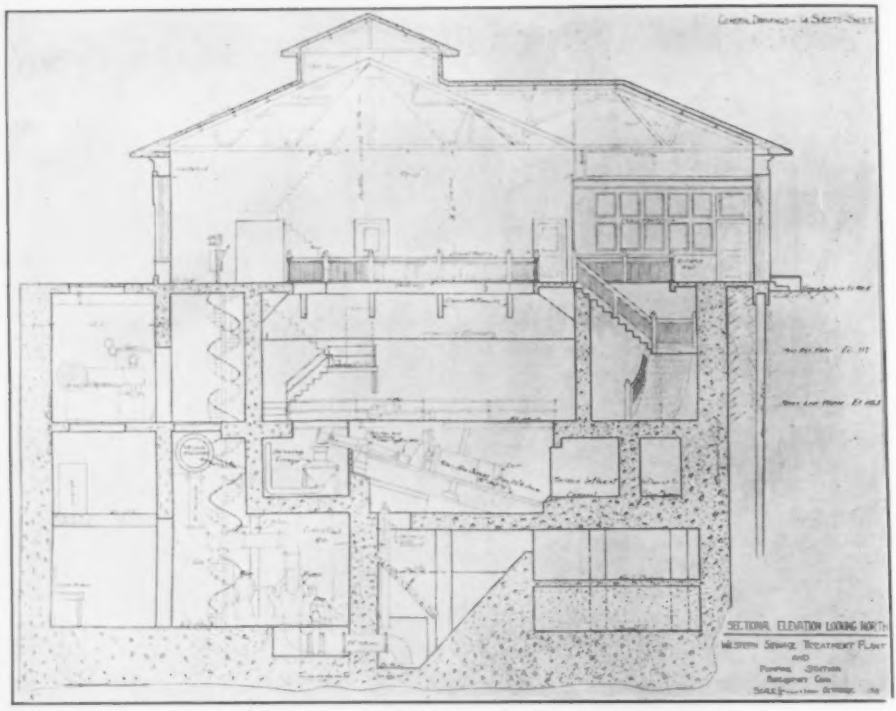
A VISIT to the sewage treatment plant located on the southwest edge of the well-populated district in Bridgeport, Conn., impresses the engineer with the thorough attention given to detail, the excellence of the concrete work, and the value of this method of treatment as applied to Bridgeport conditions.

The flow line of the interceptor at the plant is at elevation 100, or 22 feet below the street level and 10 feet below mean low water. In the original studies, several combinations of screens and pumps were considered, including the plan of having the high-level screens following the pumps, so that the screened effluent would flow by gravity to the outfall. This scheme would have saved something on the cost of construction of the station, but it was discarded mainly because the screens would be more effective if installed ahead of the pumps.

In the plant as finally decided upon and installed, the sewage from the 71-inch interceptor flows through the sluice-gate to a bar screen at elevation 100, and thence through a concrete channel to the Riensch-Wurl screens. The screened effluent flows over an adjustable weir to the sump at elevation 80, and is then lifted by the pumps to the force main at elevation 105.

The plant is designed for three Riensch-Wurl screens to handle a total dry-weather flow of 35,000,000 gallons per day. The estimated population of the district when fully developed is 180,000. As the present population of the district is in the neighborhood of 100,000, two screens have been installed and a third will be when needed. Each screen consists of a circular disk 22 feet in diameter and inclined to an angle of 15 degrees from the horizontal. A truncated cone 12 feet in diameter at the base is centrally mounted on the disc. The surface of both disc and cone consists of a number of removable bronze plates perforated with slots 2 inches long and 3/64-inch wide. The lowest point of the disc is set at the elevation of the influent, and the slope is such

A CONSTRUCTION VIEW, SHOWING METHOD OF POURING CONCRETE FOR CIRCULAR FOUNDATION



SECTIONAL VIEW OF BRIDGEPORT SEWAGE SCREENING PLANT

that about one-third of the disc is above the surface of the water.

The sewage flows onto the screen, which is revolving at the rate of about one revolution in two minutes. The liquid passes through the perforations on the disc and flows over the weir into the pump sump. The suspended solids which are retained on the screen are lifted out of the water as the screen revolves and are brushed off the screen into the hopper of the screening conveyor system. The brushes are cylindrical and are carried on a revolving spider, which is mounted on a shaft parallel with the main disc shaft. These brushes work on the same principle as a street sweeper, which is carried along the street mounted on a truck and at the same time is revolving and brushing the refuse ahead of it.

The screenings are conveyed from the hopper to the storage tanks by a pneumatic system, which does away with the necessity of handling it in open cans on an open conveyor belt. From the storage tank, which is located 10 feet above the street level, the screenings are dropped into tank wagons, carted to the town farm and buried.

The pumping equipment of the station consists of two 20-inch horizontal centrifugal pumps, each having a capacity of 15,000,000 gallons per day, and two 15-inch horizontal centrifugal pumps with a capacity of 8,000,000 gallons per day each. These pumps are direct-connected to electric motors controlled by floats in the pump sump. The floats are adjustable and electrically connected to switches and automatic motor starters, mounted on panels of the main switchboard. A Venturi tube is installed on the outfall, with the record chart and register located on one of the main switchboard panels. The 60-inch gate-valve, electrically operated, is installed in a gate-house at the discharge end of the Venturi tube. The building contains a complete system for heating, ventilating and plumbing, including toilets and shower-baths.

Method of Construction of Plant

The original plans for the plant itself were approved by the State Board of Health, and construction started about the first of

1919. The substructure is a reinforced concrete caisson, 80 feet inside diameter and 45 feet deep. The cylindrical shell forming the outside wall is constructed of a series of rings 10 feet high. The rings were cast above ground, and after the concrete in each ring was properly set, the forms were removed and the ring sunk until the top was approximately a foot above the ground. The forms were then reassembled and the next section cast. When the caisson had reached the predetermined depth, the bottom was placed under water. After the concrete bottom was set, the caisson was unwatered, and the bottom made smooth and finished to a surface. Following this, the inside walls, partitions, beams and floor slabs were built. The rectangular superstructure is of tapestry brick with stone trimmings and a red tile roof.

The lowest ring, which contains 475 cubic yards of 1-2-4 concrete and 30 tons of steel, was completed in March, 1919. After a few days the forms were removed and set for the second ring. The same forms were used for all five rings. The second, third and fourth rings, each containing 500 cubic yards of concrete and 16 tons of steel, were finished by June 1, the concrete being poured in continuous operations of about 8 hours for each ring.

After the first ring had been poured and the forms removed, the ring was allowed to sink by excavating the material from the interior. Two ¾-yard clam-shell buckets and two 65-foot boom stiff-leg derricks, set up on opposite sides of the caisson, averaged about 200 cubic yards of excavation a day. One derrick was placed on the north side of the caisson, the other on the south. On the east side toward Bostwick Avenue were two one-yard mixers and an 80-foot double hoisting tower, from which the concrete could be delivered through chutes to any part of the ring. Just north of the tower was another derrick which supplied sand and gravel to hoppers located above the mixers. As the excavation proceeded, levels were taken at frequent intervals each day on the top of the shell, and if one side was found to be sinking too fast, excavation was stopped on that side and continued near the other side until the ring was level again. At no time was the caisson more than 9 inches out of level.

In the completed structure the absence of unnecessary holes in the concrete partitions and of places where concrete had been chipped out after the forms were removed, and of other such unsightly jobs, shows the care given to the design of the complete structure and to the excellence of the work by the contractor. It is seldom that a piece of work of this type can go through from beginning to end without a considerable number of changes in design which show in patchy work when the whole structure is completed.

George W. Fuller and George A. Johnson, New York City, were the associated consulting engineers for this work. The general contractor was the Eastern Engineering and Construction Company, Bridgeport, Conn. The sewage treatment apparatus and mechanical equipment was furnished and installed by the Sanitation Corporation, New York City, and the plant is now operated by the Department of Public Works, of which J. A. Courtade is Director.

On the Calendar of Conventions

MARCH 22-23.—INDIANAPOLIS, IND.
Indiana Sanitary and Water Supply Association. Annual meeting. Secretary, C. K. Calvert, 1902 North New Jersey Street, Indianapolis, Ind.
APRIL 19-21.—SPARTANBURG, S. C.
Tri-State Water and Light Association of the Carolinas and Georgia. Annual meeting. Secretary, W. F. Stieglitz, Columbia, S. C.
MAY 1-4.—NASHVILLE, TENN.
Southern Commercial Secretaries Association. Annual convention. Secretary, Roger Miller, Chamber of Commerce, Macon, Ga.
MAY 9-11.—ATLANTIC CITY, N. J.
National Fire Protection Association. Annual meeting. Secretary, Franklin H. Wentworth, 87 Milk Street, Boston, Mass.
MAY 15-19.—PHILADELPHIA, PA.
American Water Works Association. Annual convention. Secretary, J. M. Diven, 153 West 171st Street, New York, N. Y.
MAY 15-19.—ATLANTIC CITY, N. J.
National Electric Light Association. Annual convention. Executive Manager, M. H. Aylesworth, 29 West 39th Street, New York, N. Y.
MAY 15-21.—WASHINGTON, D. C.
Chamber of Commerce of the United States. Annual meeting. Secretary, D. A. Skinner, Mills Building, Washington, D. C.
JUNE 4-6.—SALT LAKE CITY, UTAH.
American Association of Engineers. Annual convention. Secretary, C. E. Drayer, 63 East Adams Street, Chicago, Ill.
JUNE 13-17.—VICTORIA, B. C.
Canadian Good Roads Association. Annual convention. Secretary, George A. McNamee, 909 New Birks Building, Montreal, Quebec, Canada.
AUGUST 9-18.—SAN FRANCISCO, CALIF.
International Association of Fire Engineers. Annual meeting. Secretary, James J. Mulcahey, City Hall, Yonkers, N. Y.
OCTOBER 9-13.—CLEVELAND, OHIO.
American Society for Municipal Improvements. Annual convention. Secretary, Charles Carroll Brown, P. O. Box 234, Petersburg, Fla.

What Is a Fair Salary for a Fire Chief?

THE accompanying table was prepared from the returns on a questionnaire sent out by THE AMERICAN CITY. In analysing the figures given in a table of this sort great care must be taken to avoid jumping to conclusions. The simple figures of population and dollars cannot state the whole case in regard to a given city. For instance, the cost of living varies widely in different parts of the country, naturally imposing different standards of pay.

The most striking fact to be learned from a table of this sort is the want of standardization of salaries, which was demonstrated by William E. Mosher in the article, "A Fair Wage Versus a Chance Wage" in THE AMERICAN CITY for February. Looking down the table, we note that of two Massachusetts cities of over 50,000, Brockton and Cambridge, it is the smaller city that pays the larger salary. Binghamton, N. Y., Brockton, Mass., and Allentown, Pa., are nearly equal in size, yet the Allentown salary is not much more than half of the Brockton figure, while Binghamton is midway between. Yonkers, N. Y., is little smaller than Cambridge, Mass., yet its salary is $1,000 greater, and is double that paid in Reading, Pa.* Possibly the character of the industries of these cities accounts for a variation of the size of the department required and the consequent demands on the Chief.

Passing to the cities between 25,000 and 50,000, the table shows a greater amount of uniformity. The largest salary reported is in Lorain, Ohio, $3,000, the smallest, in Irvington, N. J., $1,800, though there is a considerable difference in the size of the towns. There is a sharp contrast between Lima, Ohio, and Lorain, Ohio, the cities being nearly of a size.

Among the cities between 10,000 and 25,000, comparisons are more difficult, as such cities vary widely in character: some are largely manufacturing, others mostly residential. The character of the manufacturing carried on might involve great difference of fire hazard, yet in this group there is surprising uniformity of salary. The largest reported salary is that of Corning, N. Y., $2,040, and the smallest, Fulton, N. Y., $780, although these places are of nearly equal population.

Among cities of less than 10,000 there are great contrasts of salary. This is due primarily to the fact that some have volunteer departments, while others have full-time crews. For example, Suffolk, Va., pays $1,800 a year, and Saranac Lake, N. Y., with a population but little smaller, pays the Chief nothing. In general, throughout this group the salary is nominal, $100 being a figure frequently met.

The group of places under 5,000 offers the widest discrepancies in salary. Population figures are given for places over 2,000 under the 1920 census, while those for which no population is given have less than that number. In most cases here, the salary is nominal, there being a few notable exceptions. Ocean City, N. J., may be regarded as a peculiar case, owing to its character as a seaside resort, with a fluctuating population. An interesting feature is the salary in Hillsboro, Ohio, $30 a year, with an allowance of $2 per call answered. Other exceptions are the allowance in Wheaton, Minn., of $1 an hour for time actually consumed in fire-fighting, and in Clarkston, Wash., of $5 per fire.

It is unusual for a city to call to head its department a man who has made a record as fire chief of another city. As a rule, the chief is chosen from the fire department of his city, after years of service. Owing to his specialized profession, there is no free market for his services—the city is not obliged to bid for his service against competitors within itself, as in the case of a city attorney or engineer. From the very nature of his profession, the chief is obliged in many instances, to accept what his city chooses to offer him.

It is impossible to look through the accompanying table and say, "This city pays too much," or "That city pays too little." Special circumstances may control what seem to be the most serious injustices. But the tables do show that some cities are paying less than what may be termed an average salary for cities of their class; and such a statistical tabulation is of value in showing such cities how they stand in comparison with other cities where approximately the same conditions prevail.

* A volunteer department.

SALARIES OF FIRE CHIEFS

FIGURES STATE ANNUAL SALARY, UNLESS OTHERWISE SPECIFIED

State and City	Population	Over 50,000	25-50,000	10-25,000	5-10,000	Under 5,000
IOWA:						
Harlan	2,831					$37
Marshalltown	15,731			$130 per mo.		
Tipton	2,142					None
KANSAS:						
Kingman	2,407					$1
MASSACHUSETTS:						
Brockton	66,254	$3,500				
Cambridge	109,694	3,000				
Hudson	7,607				$1,550	
Salem	42,529		$2,275			
MICHIGAN:						
Battle Creek	36,164		2,400			
Grand Rapids	137,634	3,273.75				
MINNESOTA:						
Albert Lea	8,056				$150	
Benson	2,111					$50
Wheaton						$1 per hr.*
MISSOURI:						
Kirksville	7,213				$75 per mo.	
Marceline	3,760					$5 per mo.
Warrensburg	4,811					$100 per mo.
MONTANA:						
Bozeman	6,183				$152.50	
NEBRASKA:						
Hastings	11,647			$1,800		
NEW JERSEY:						
Irvington	25,480		$1,800			
New Brunswick	32,779		$2,700			
Ocean City						$112.50 per mo.
Princeton	5,917				$50	
NEW YORK:						
Auburn	36,192		$2,400			
Batavia	13,541			$1,650		
Binghamton	66,800	$2,760				
Corning	15,820			$2,040		
E. Syracuse	4,106					$200
Fulton	13,043			$780		
Granville	3,024					None
Herkimer	10,453			$1,560		
Jamestown	38,917		$2,200			
Little Falls	13,029			$1,680		
Middleburg						None
N. Tonawanda	15,482			$1,800		
Rochester	295,750	$4,200				
Saranac Lake	5,174				None	
Saratoga Springs	13,181			$2,000		
Watervliet	16,073			$1,600		
Yonkers	100,176	$4,000				
Champlain						None
NORTH CAROLINA:						
Spring Hope						None
NORTH DAKOTA:						
Casselton						None
OHIO:						
Ada	2,321					$50
Akron	208,435	$4,500				
Bryan	4,252					$1,800
Covington						None
E. Palestine	5,750				$100	
Hicksville	2,378					$50
Hillsboro	4,356					$30**
Lima	41,306		$2,112			
Lorain	37,295		$3,000			
Marietta	15,140			$125 per mo.		
Middletown	23,594			$2,000		
Ravenna	7,219				$100	
Tiffin	14,375			$1,800		
OKLAHOMA:						
Enid	16,576			$200 per mo.		
Geary						$55
Stillwater	4,701					$115
OREGON:					$150	
Baker	7,729					
Salem	17,679			$1,800		

* While fighting fires.
** Plus $2 per call.

SALARIES OF FIRE CHIEFS (*Continued*)

State and City	Population	Over 50,000	25-50,000	10-25,000	5-10,000	Under 5,000
PENNSYLVANIA:						
Allentown	73,502	$2,000				
Bellefonte	3,996					None
Bristol	10,273			None		
Brockwayville						None
Brookville	2,272					None
Carbondale	18,640			$350		
Harrisburg	75,917	$2,500				
Oil City	21,274			$1,740		
Philadelphia	1,823,779	$5,000				
Pottsville	21,876			$1,500		
Reading	107,784	$2,000				
Warren	14,256			$2,100		
York	47,512		$2,000			
RHODE ISLAND:						
Central Falls	24,174			$1,400		
Providence	273,595	$70 per wk.				
SOUTH DAKOTA:						
Aberdeen	14,537			$145 per month		
Mitchell	8,478				$100	
TENNESSEE:						
Jellico	1,875					$60
VIRGINIA:						
Portsmouth	54,387	$2,520				
Suffolk	9,123				$1,800	
VERMONT:						
Rutland	14,954			$1,550		
WASHINGTON:						
Clarkston						$5 per fire
Spokane	104,437	$3,105				
WEST VIRGINIA:						
Bluefield	15,282			$175 per month		
Martinsburg	12,515			$1,500		
WISCONSIN:						
Eau Claire	20,880			$2,400		

Municipal Lodging House Useless Unless Run as "Human Repair Shop"

EXPERIENCE with the municipal lodging-house in New York City during the past four years is a warning to other cities that it is a costly and ineffective institution if operated as a mere shelter, instead of as a "human repair shop" and clearing-house for unemployed and homeless men and women.

This statement is made by Stuart A. Rice, formerly superintendent of the New York Municipal Lodging House, in the *American Labor Legislation Review*.

"Completed in 1909 at a cost of nearly $400,000, with a 'model' plant and equipment, the institution quickly became known throughout the world and might reasonably have been expected to provoke extensive imitation. The expectation has not been realized. Not to exceed half a dozen American cities have a municipal lodging-house, and even in these, the question of its discontinuance is periodically brought forward."

Failure to distinguish between "unemployable" persons, such as the sick and defective, and the "unemployed," whose only need is a job, is a serious fault of municipal lodging-house administration. Separate treatment for the two classes is essential. Two distinct problems arise when "a temporary demand for emergency shelter for unemployed men is periodically superimposed upon a continuing demand for the classification and treatment of unemployable men."

Official reports show that the daily per capita cost for each lodger at the New York Municipal Lodging-House during 1918 and 1919 was $1.50. "One dollar and a half a day," says Mr. Rice, "would be a reasonable per capita expenditure for a 'human repair shop,' such as was visualized by Commissioner John A. Kingsbury in his 1914 report to Mayor Mitchel. But when New York City spends $1.50 in providing a 30-cent 'flop' to its guests, the absence of imitators among municipalities can readily be explained.

"A 'clearing-house' for homeless men and women—such as a municipal lodging-house should be—would make a thorough-going effort to understand the ills—physical, mental and social—that afflicted each of its inmates. In brief, its end would be the permanent solution of the human problem with which it is confronted."

A Successful Municipal Abattoir

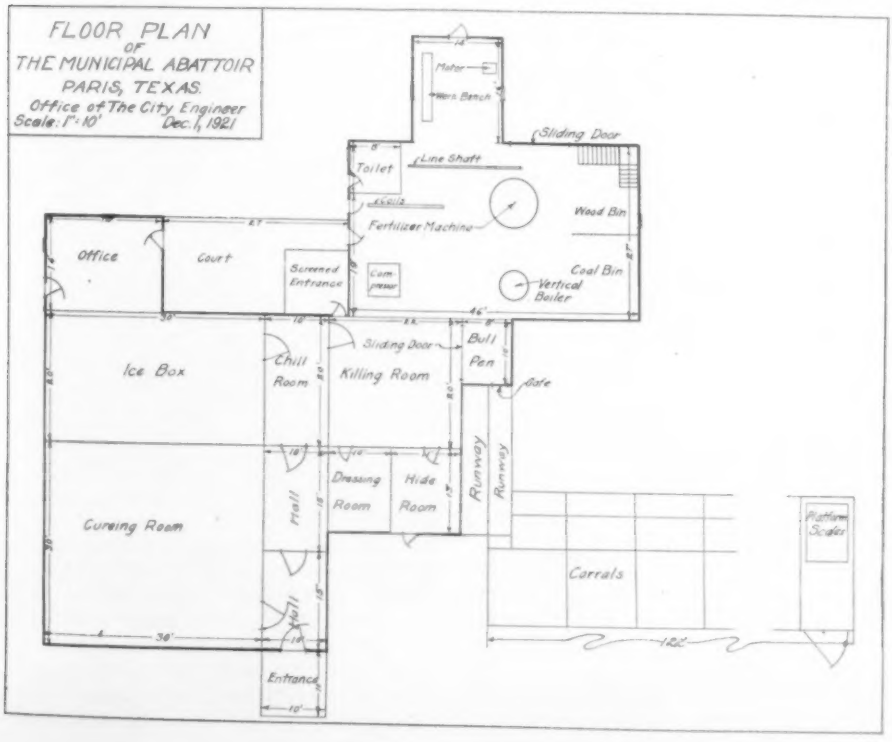
The Community Value of the Paris, Texas, Abattoir Shows Great Possibilities for These Public Utilities

By Cora Lee Moore
Secretary to the Mayor, Paris, Texas

ABOUT 88 per cent of the fresh meat used in Paris, Texas, is slaughtered at the municipal abattoir. The cattle and hogs which are slaughtered are brought in from the surrounding country, and in that way the city furnishes a market for the live stock raised by the small farmer. Without this, the farmer in selling or disposing of his live stock would have to pay for freight and not receive any more per pound after shipping to outside buyers. The abattoir not only provides a market for animals but also enables the people of Paris to obtain a first-class quality of meat at a price considerably lower than could be obtained if this meat had to be imported from the packing-houses.

At the abattoir the most scrupulous sanitation is observed, as well as careful screening and good ventilation. Hogs are brought in from the yard, killed, scalded, scraped, properly cut up and dressed; the carcasses are placed in the cooler and remain there for 12 hours, at 40 degrees Fahrenheit. At the end of this period, following the usual order of things, they are placed in the "big box," a refrigerating room kept at a temperature ranging from 32 to 36 degrees. Four days' free storage is allowed each customer, the charges being as follows:

City Meat Markets.—Beeves, $2.50 each; hogs and calves, $1.50 each; sheep and goats, $1.00 each, including inspection. Ten cents per day is charged after four days.



Private killings.—Beeves, $2.50 each; hogs and calves, $1.50 each; sheep and goats, $1.00 each, including inspection. Hogs when cut up and salted down, $2.50 each. Five cents per day storage after the first four days. Salt is furnished by the city.

It is a rule that everything brought to the Paris abattoir must be brought alive, to enable the expert veterinarian employed by the city to make the inspection of animals on the hoof, as required. Another inspection of the carcass is made by a second official. No meat may be offered for sale within the corporate limits that does not bear the stamp of the city inspector. This applies even to all shipments of meat or fish that may be brought in by rail from packers or others. In this way the health of the public is protected from tuberculosis and other diseases, and the best quality of meat is insured. A salary of $100 a month is paid the veterinarian for his services of inspection, which occupy only a portion of his time.

Besides the veterinarian, the force employed at the Paris abattoir consists of a bookkeeper who looks after the general management of the plant, collecting, etc., an engineer for the refrigerating machinery, and three butchers or skinners, one of whom makes deliveries to the retail butchers in the city.

The Plant Incinerator

Animals that are rejected by the veterinary are consumed in the huge incinerator operated in connection with the abattoir. It is often necessary for an attendant to stand by to restrain negroes from snatching part of the condemned meat from the flames. The incinerator serves other useful purposes. All combustible trash, city garbage, dead dogs, cats, chickens, and waste of every description is hauled by the city free of charge and destroyed in the large burners. The incinerator is so arranged that no other fuel is required than the trash gathered from the city. This entirely eliminates the unsightly paper and trash dumps so commonly seen around towns and cities that would otherwise be beautiful. The incinerator is never without a useful job to do.

The Curing Plant

A curing plant is run in connection with the abattoir. This addition cost approximately $5,000 and was made to meet the urgent need of farmers who desired to be able to kill hogs at any time during the year. This curing plant, maintained at a temperature of 40 degrees, is fully equipped in accordance with modern practice, and each customer has his own bin, upon which he may place a padlock if he so desires. His name and tag are on the box. He calls and checks out his meat whenever he chooses; or if he so desires, he may check out any portion of the meat, leaving the remainder in cold storage. Any citizen of the town or surrounding country can have his meat slaughtered and stored here any day during the year, and the farmers particularly are taking advantage of this service, so that this part of the plant is generally well filled.

The whole plant is housed in a one-story wooden building and cost when constructed about $10,000. Some parts of the equipment, however, have been replaced.

The Paris abattoir made its errors, but persistence and careful management have placed it on a paying basis. For several years, at the start, the abattoir failed to pay. It was discovered that its volume of business did not justify the operation of the fertilizer plant which had been installed. Also, it soon became apparent that the charges were too low, and when they were raised to a point where they would make an adequate return, there were no complaints from the customers. Quite a number of minor changes, all tending toward the betterment of the abattoir, both materially and financially, took place in the first year of operation. Each year finds room for improvement, adding here and there more modern equipment, etc. The last few years have been very profitable ones for the plant. In 1919 the cost of operation was $9,514.56, which included $2,000 for remodeling. The receipts amounted to $10,730.54, and in 1920 the receipts exceeded $12,000.

Hog Raising

A unique but nevertheless profitable feature is the raising of hogs on the offal of the plant. Their feed consists only of the clean waste from the beeves slaughtered by the city, and some corn. Sales are made in small lots usually. In the latter part of 1919, however, one retail butcher bought hogs from the city for which he paid

879.45; a few months later another sale was made amounting to $654.90; another in 1920, $1,215, and still another for $290. This is practically clear money, as there is very little expense attached to this department. In the last few months the market has fallen off considerably and there are very few sales made from the abattoir pens. There are on hand at present about 37 hogs weighing from 250 to 350 pounds, and 107 ranging from 100 to 175 pounds.

After twelve years of trial, the Paris abattoir is giving genuine satisfaction to the city and the surrounding territory, and it is believed that the community would not do without this advantage to the general welfare through the output of clean, wholesome and sanitary meats. The plant is claimed to be the first of its kind in the United States and should serve as a basis on which every town and city with a population of 5,000 or more can base a like institution, especially where there is a chance of giving a market to the small producer and of improving the quality and lowering the price of meats to the consumer. It is hoped within a few years to build a brick structure which will have a more commodious cooling room, refrigerating room and curing plant, and perhaps a smoke-house and other new features. The cost of a new plant would mean a far greater expenditure than the present successfully operating abattoir represents.

New Street Signs in San Francisco

Definite Replacement Program Will Give Entire City These New Signs in a Few Years

THE long-heralded and urgently needed new street signs to guide the stranger and assure the native of his destination have appeared in San Francisco. Convenient and understandable street signs in San Francisco have been a matter that has been agitated by civic organizations and automobile clubs for a long time, and when all the signs are installed it is expected that the streets of this city will be marked as conveniently and thoroughly as those of any metropolis in the country.

In the past the signs have been placed at various elevations and upon different types of supports, including telegraph poles, lamp-posts and buildings. The result has been far from satisfactory, and the appropriations made for this work have not resulted in a standardized system of any pronounced effect.

The new sign, made by the California Metal Enameling Company, Los Angeles, is of the criss-cross type and consists of four porcelain plates 5 inches by 22 inches with 3-inch letters mounted in a channel iron frame ½-inch by 1 inch. The complete frames and plates are in turn mounted on a 3-inch standard pipe support measuring 9 feet from the ground to the bottom of the lower sign. The letters are of white on a background of dark blue. One standard complete with signs erected cost $18.

TYPE OF NEW SIGNS IN SAN FRANCISCO

According to the program of City Engineer M. M. O'Shaughnessy, it is the intention to place these signs first in the downtown section of the city, and each year to carry out the work in the other sections until every unit of the city is equipped with proper and conspicuous street signs. The signs in the down-town section will make their first appearance from the Embarcadero to Van Ness Avenue.

The 1921-22 budget provides for an appropriation of $7,500 for street signs for this fiscal year, and will carry the same allowance each year as long as needed.

The New American Falls, Idaho—A Town Reborn

By Russell VanNest Black
Town Planner

INSTANCES of planning the growth of cities from the beginning are exceedingly rare. Most planning efforts are occupied with the patching of hopelessly jumbled grown cities—not planning, but replanning. When the rare opportunity comes to build a town from the ground up, it is hailed with delight. The planning for the new American Falls has been just such a pleasing problem.

After the days of the mining booms, men settled back into the fertile valleys. There towns grew upon the firm foundation of agriculture. Irrigation, sheep and cattle raising, dry-farming of wheat, and, later, hydro-electric power, were the largest factors of growth. Wherever railroads tapped these resources, towns sprang into existence.

Such a community is the old American Falls, county-seat of Power County, Idaho. It was founded with the coming of the railroad and lies in the very fertile but arid Snake River Valley at the point where the Oregon Short Line Railroad crosses the river. The original town, now a community of 1,554 people, was built without plan or foresight, partially upon land ill adapted to civic growth.

Moving the City

In developing plans for the utilization of the hydraulic resources of the upper Snake River watershed, it has been found that a maximum development will involve the construction of a dam at American Falls, where topographic conditions render feasible the most efficient control of the stream. This dam will create a reservoir 125 square miles in area, impounding water sufficient to irrigate 300,000 acres of very fertile land. The work is planned to be financed largely by contributions from local interests under the direction of the United States Reclamation Service. Preliminary to undertaking actual construction and in addition to the work outlined in this article, the Reclamation Service has completed diamond drill borings at the proposed dam site and has made extensive surveys and engineering studies. It is estimated that the cost of the reservoir may exceed $13,000,000.

More than four-fifths of the old American Falls lies within the area to be submerged. In all, there must be moved or wrecked: 344 residences, 46 business houses, 3 hotels, 2 schools, 5 churches, 1 hospital, 6 grain elevators, 1 flour mill, and numerous shacks and sheds. The railroad, which now passes through the center of the town, also falls for a short distance within the reservoir right of way, and must be moved a maximum distance of 1,600 feet back from its present location.

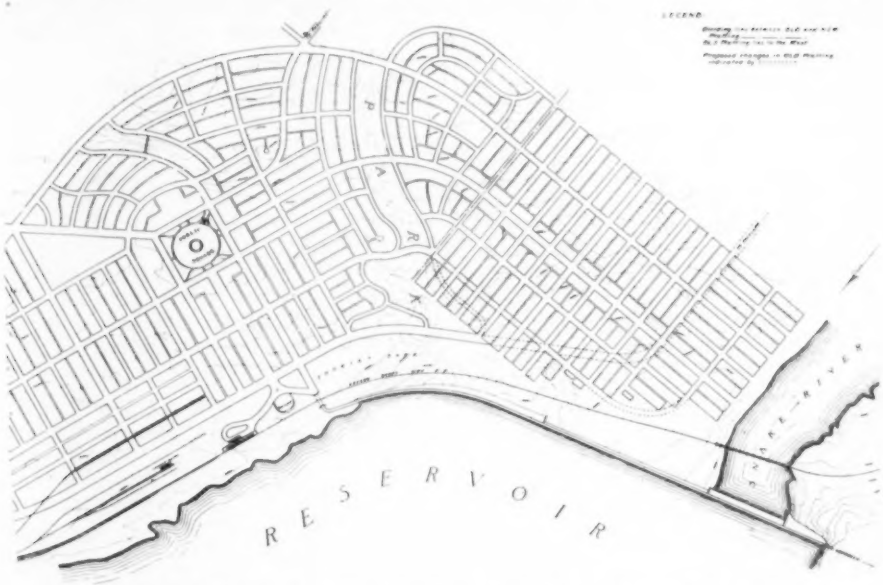
Rather than risk the results of private initiative, the Government has undertaken the relocation of the community. Six hundred acres of virgin land adjacent to a small part of the old town, which need not be greatly disturbed, was purchased as a site, and the writer was engaged to prepare complete plans for the new town.

The new site is on the higher ground, approximately a half-mile east of the old business center. Comparatively level and unbroken except by one or two shallow draws, and sloping gradually from the reservoir back to the low, irregular hills, it is almost ideally adapted to civic development. The only difficult adaptation is an adequate connection with the surviving small, ill-arranged section of the old town.

A chief problem lay in the size of community for which to plan. In the building of cities there is but one thing apt to do greater injury than the neglect to plan and provide for the future, and that is, to promote a city where no power on earth could properly maintain more than a hamlet.

The Town's Probable Future

Thorough investigation has been made of the apparent resources of the district and their probable influence upon the growth and prosperity of the new town. Thousands of acres of undeveloped irrigable land within the zone of influence; vast extent of wheat lands that may be dry-farmed to greater



MAP OF AMERICAN FALLS, IDAHO, SHOWING THE OLD AND THE NEW SECTIONS

It is rare that the town planner can plan for an entirely new city. American Falls, Idaho, must be entirely rebuilt, on account of the needs of reservoir construction. The head of the arrow, at the extreme right, indicates north

advantage; the continued and possibly increased raising of cattle and sheep; unlimited electric power and the possibility of the development of such industries as flour mills and wool-scouring mills in this community, central to so much wheat and wool production; the increasing importance of the town as county-seat; the reservoir as an engineering accomplishment of broad interest, and possibly as something of a pleasure resort, attracting visitors from far and near; and the thousands of workers to be brought in during construction of the dam, some of whom will inevitably remain—all point to a bright future for the community. Leaving out of consideration the not improbable discovery of some undeveloped natural resource, it is not difficult to see the ultimate town grown to a thriving community of not less than 10,000 people.

This possible population has been assumed as a basis for the plan, which, however, is of an expansive nature, comfortable for the few as well as for the many. If for any unforeseen reason the city does not grow, it will be comfortably accommodated near the center of the new site. If it needs to expand, land and streets are provided to permit of development along the most logical lines at a minimum of inconvenience.

Determining Factors

The general character of the street system is largely determined by the location of the railroad, fixed by grade, the reservoir on the west, and the low, irregular hills on the east. Other factors are the surviving section of the old town and the highways entering from the surrounding country. The three chief highways are: from Pocatello, the nearest considerable community, 30 miles to the north; from Rockland and the dry-farming districts to the south; and from the territory across the river to the west.

The hills and reservoir have forced a plan somewhat elongated northeast and southwest. This happens also to be the general direction of the heaviest traffic flow, up and down the valley, and is the most logical trend of growth. Each of the main highways is brought into town with consideration of its greatest use, and is distributed as directly as possible to the various centers—residential, business, industrial, and social. Effort has been made to lead these highways into, rather than through, the community, necessitating that every traveler obtain at least a glimpse into the heart of the town.

The location of the railroad has been a large factor in laying the first foundations. To obtain suitable grade, it is necessary that

the railroad skirt the reservoir. Since this eliminates the possibility of its ever cutting through the community, and since for the greater distance through the town it passes unobtrusively through a deep cut, this location is not undesirable.

Approaching from the west, the railroad enters upon a heavy grade which places the westernmost practical location for the passenger depot approximately as indicated on the plan. It is desirable that the business center of the community be located in some convenient relation to the depot. Coincidentally, the area directly east of the proposed depot location, being comparatively level and centrally located, is well adapted to development as the business and social center.

The Various Sections of the Town

A broad avenue, designed as the chief retail business street, is carried from the railroad and reservoir back some 1,400 feet to a large public square, terminating in the court house beyond. This public square is planned to become the recreation center of the community, and sites have been reserved on its four sides for the various public and semi-public buildings, including: the court house, Federal building, recreation hall, churches, hotel, and theater.

In the northwest section of the site, adjacent to the railroad and the freight depot and to the leeward of the rest of the community, an adequate tract has been reserved for storage warehouses, grain elevators, loading-pens, heavy business, and whatever mills or industries may desire accommodation. Blocks in this district have been turned in a contrary direction, to make them more accessible to spur tracks and to afford somewhat of separation from the second-class residential district located on the level, fertile land directly east of and accessible to the industrial district and readily adaptable to the economical development of homes and gardens.

South and southeast of the public square and separated from the second-class area by a large combined school and playground, is the first-class residential district. This largely occupies the first level of low, irregular hills, more adapted to the better class of development.

Complete restrictions defining the various are to be placed in the land contracts until such time as a zoning ordinance, based upon these restrictions, can be put into effect. First- and second-class residential districts are to be differentiated by construction only. The retail business district, including the broad avenue mentioned above and the flanking streets on either side, has also been divided into first and second classes, the differentiation being based upon construction and use. The section of the old town to be retained, not being the property of the United States, must remain unrestricted until a zoning ordinance is obtained, but it is of a character unlikely to be of appreciable influence upon the remaining development.

The Streets

The average lot size in the second-class residential district is 60 x 135 feet, and is but slightly larger in the better-class district, comparative size throughout being based upon adaptability to use. Business lots average 25 x 125 feet, and the industrial area is divided into 50-foot frontages for convenience of sale.

Street widths vary from 50 feet for minor residential streets to 80, 90 and 100 feet for the main traffic leads, and 120 feet for the short business street. All streets, in cross-section, have been arranged upon an elastic plan, with trees set to permit pavement widening as need demands. To obtain desired openness and space between houses, set-back lines varying from 15 to 30 feet are established throughout the residential districts. All streets have been arranged with a feeling for topography, to the end that there are no excessive grades or side-hill cuts.

Because the district is accustomed to their orderly use and is not of a type in which they are likely to become dangerous, public alleys have been used throughout. They are to carry the electric light and telephone poles and other public utilities, including sewer and water.

Water will be obtained from wells driven in the higher ground east of the city. This source failing, large flowing springs on the west bank of the river will provide a bounteous supply.

Because of the low rainfall, about 15 inches, the surface run-off can be cared for without any great extent of storm-water sewer. Sanitary sewage will be treated in septic tanks.

Provision for Parks and Playgrounds

Adequate areas are reserved in the plan for parks and playgrounds. The public square is to become a restful area of cool shade and greensward, furnished with a band-stand, a bit of splashing water and a wading pool for the youngsters. It is to be, in every sense, the recreation center of the community.

A shallow draw, a stream-bed dry during most of the year, extends through the southerly portion of the new site from the railroad to the hills. This draw is ill adapted to residential use. It is to be developed as a naturalistic park with flanking park-like streets and walks, and planted to a few of the more hardy local native evergreens and shrubs. In this mecca of the automobile tourist it has become incumbent upon all communities to provide tourists' camping parks. An area between the main highway from the south and the railroad is well adapted to this use and has been reserved for that purpose.

This is the present extent of park land, with the exception that it has been recommended that, as the community grows, attention be given to the preservation and development of the reservoir shore and river bank.

Two new school sites have been reserved, each with area adequate for playgrounds to serve the whole community.

Trees have been recommended for all streets, including those of the business district. The poplar is the favorite tree in most parts of the Snake River Valley. However, experimental planting has proved that the better trees, such as oak, elm and linden, if given water, will thrive even more vigorously here than in the East. The better trees have been recommended throughout the entire community.

To insure the comfort of the present small town in the full-grown plan and to provide that the community shall be conveniently and economically condensed throughout its various periods of growth, a considerable number of blocks of the extremities of the platted area will be temporarily withheld from sale, and the first public improvements will be installed only in the district of logical earliest development and will be extended little in advance of demand.

A Beautiful Example of Library Architecture

VERMONT SQUARE BRANCH LIBRARY, LOS ANGELES, CALIF.

Municipal Finance

BONDING **ACCOUNTING** **TAXATION**

Detailed Revenues in New Jersey Cities

By Sedley Hopkins Phinney

Executive Secretary, New Jersey State League of Municipalities

THE tables accompanying this article are two selected from six original compilations made by the Bureau of Municipal Information conducted by the New Jersey State League of Municipalities. They appear in the Appendix of a 45-page study of "New Sources of Municipal Revenue" intended as an aid to the harassed city official seeking new revenues. They are practical demonstrations of actual revenue possibilities disclosed by the experience of cities of various sizes.

Table I is entitled "Classified Revenues of New Jersey Cities in 1920." It was compiled from the latest municipal audits available, on file in the State Department of Municipal Accounts. The figures are revenue accruals, not actual cash receipts, and the classification used is that of the United States Census Bureau slightly modified. As the audits failed to report fully on certain classes of revenue, the following were omitted from the tabulation, and the individual figures were given in the text: Special Assessments, Subventions and Grants, Donations and Gifts, Rates, Highway Privileges, and Rentals of Equipment.

The individual figures were built up by a classification of all the items appearing in the audits, usually necessitating going into the cash receipts of the mayor, city clerk, city engineer, health department, library, etc. In many cases it was not possible to be sure of the proper classification of an item, and many figures given were lump figures which could not be divided. The table represents the best that could be done with the material at hand.

Since the cities have been arranged in order of population, cities of comparable size are automatically brought together, and the city official can readily run his eye over the columns and see how his revenues in each class compare with those of other cities. By quick computations the actual per capita comparisons can be made of striking figures.

Take a few examples of the use of the tables by a city official. Camden and Trenton are nearly the same size, and their total revenues are almost identical, yet for Trenton the interest on bank balances is twice that for Camden, while the item "All Other Interest and Costs" is six times as great. What is the reason for this? The Camden official who is curious about this item would make a careful survey of all factors involved,, interest rates, amounts of money on deposit, whether short-term or long-term deposits, stringency of enforcing interest and cost charges on delinquent taxes, and other similar matters. The chances are that this search would disclose wastes or unused revenue possibilities. Inequalities in the collection of the poll tax are still more startling. Jersey City, with a population of three-quarters that of Newark, collects about one-fourteenth as much poll tax; and only one-quarter of the amount collected by Trenton, which has about one-half of Jersey City's population. Other inequalities suggest either laxity of collection or an inherent defect in this form of tax, probably both. The purely nominal amount of rentals of land and buildings in some cases raises a query. For instance, what is it that Bayonne rents for $75 per annum, and South Amboy for $25? Could not full market values be charged for these properties? It must be understood that these questions are purely illustrative and are not criticisms of these particular administrations.

Probably the most significant and most fruitful of enhanced revenues are the columns "Fees and Charges" and "Licenses

	Population	Property Tax	Poll Tax	Gross Receipts Tax	Tax Franchise	Licenses and Permits	Fines and Forfeits	Fees and Charges	Rentals of Land and Buildings	Interest on Bank Balances	All Other Interest and Costs	Total Interest	Miscellaneous	Total Revenues
Newark	414,524	$18,287,622.63	$101,244.00	$705,419.08	$337,299.66	$321,170.51	$64,627.62	$94,663.18	$96,704.78			$287,264.07	$17,962.53	$20,143,548.33
Jersey City	298,103	11,236,989.95	7,177.00	264,486.79	130,677.32	69,850.34	13,707.00	81,609.80	34,625.56	$56,432.69	$132,922.05	189,354.74	48,594.98	12,028,478.50
Paterson	135,875	1,699,654.67	4,922.50	71,352.46	177,826.02	31,476.40	10,637.70	46,299.95	620.00			96,490.21	6,937.30	2,172,325.75
Trenton	119,289	1,963,648.63	29,121.00	55,856.63	110,313.18	47,365.08	18,462.64	48,488.32	7,322.87	16,362.87	152,103.91	135,741.04	6,432.80	2,416,324.39
Camden	116,309	1,284,474.62	13,036.00	125,415.37	135,699.31	21,559.69	23,083.28	16,715.01	6,544.01	8,579.64	24,961.67	33,441.31	29,493.85	2,202,725.69
Elizabeth	95,783	1,284,190.85	22,699.00	36,297.04	106,444.40	24,838.71	14,413.13	19,192.89	1,844.00	14,021.80	20,138.42	34,160.22	3,454.72	1,729,546.33
Bayonne	76,754	2,167,306.32	1,572.00	14,221.95	46,602.13	35,287.85	10,920.42	351.00	75.00	14,400.64	13,680.52	28,081.16	9,771.39	2,314,189.22
Hoboken	68,166	1,617,088.14	2,169.00	28,419.35	39,333.86	18,545.07	10,183.55	20,570.73	5,075.00	18,005.95	19,251.68	37,257.63	330.86	1,779,273.19
Passaic	63,841	973,787.82	4,654.00	21,028.33	58,730.47	19,310.36	22,743.07	2,326.36	411.50	3,978.73	18,629.05	22,607.78	18,501.72	1,148,904.48
East Orange	50,710	1,251,144.02	7,675.50	37,093.35	58,497.66	41,398.73	1,478.85	Incln'd under Licenses	391.00			22,660.80	10,858.15	1,381,201.06
Atlantic City	50,707	1,516,070.52	10,129.00	47,245.84	159,677.00	207,245.35	11,743.90	2,447.20		9,363.73	38,041.02	47,408.75	17,204.86	2,019,172.42
Perth Amboy	41,707	702,788.38	1,036.00	14,676.64	28,774.98	5,933.09	11,110.57	11,742.50	680.00			11,045.20	3,544.78	806,832.14
Orange	33,268	465,365.23	2,096.00	21,183.32	45,710.82	6,970.17	6,196.25	12,822.12	7,317.04	1,749.91	19,091.40	20,841.31		609,670.45
New Brunswick	32,779	471,970.44	5,456.89	14,762.88	36,468.80	10,467.94	4,737.19	2,280.00	720.05	10,543.59	10,005.52	20,549.11	1,140.84	607,695.29
Plainfield	27,700	389,131.86	5,632.00	21,426.87	40,731.97	8,095.33	5,627.58	7,638.46	704.18			19,436.34	3,104.25	501,528.84
Clifton	26,470	42,790.80	1,346.00	3,403.29	39,552.87	4,972.80	4,955.25	3,615.10		3,586.05	5,656.88	9,242.93	4,613.23	115,929.72
Garfield	19,381	323,855.30	1,931.00	1,132.04	10,027.71	5,393.20	3,450.91	263.25	174.00	3,273.15	5,730.37	9,003.52	581.54	379,816.67
Millville	14,691	94,995.10	3,731.00	8,361.79	13,215.85	1,212.06	1,212.06	1,212.06						123,970.12
Bridgeton	14,323	83,010.58	3,759.00	8,901.30	11,444.25	5,283.60	1,403.05		210.00			2,747.27	8,329.41	161,756.86
Long Branch	13,521	366,116.62	2,061.00	14,387.08	35,737.27	4,799.33	2,003.00	532.00		1,447.86	4,174.72	5,622.58	55.00	431,313.88
Asbury Park	12,400	562,282.00	None	3,406.27	9,483.45	49,211.60	3,723.25	1,503.45	153,238.18	661.45	42.25	703.70	5,580.16	789,236.04
Gloucester	12,162	184,145.56	2,700.00	3,397.49	6,922.71	2,429.08	777.82			160.74	899.87	1,060.61	297.68	202,576.95
Englewood	11,627	338,265.45	800.00	7,759.35	22,763.87	1,640.58	2,878.20	893.05	600.00			6,366.34	285.39	382,252.23
Rahway	11,042	142,937.87	2,563.00	4,216.72	17,589.93	2,255.75	1,529.41	2,582.00	330.00			5,704.30	2,431.06	183,085.27
Summit	10,174	185,909.27	1,620.00	5,599.88	17,478.73	2,671.95	105.57	1,539.00				3,850.32	1,366.55	220,237.27
Burlington	9,049	74,699.27	1,893.00	5,831.79	14,990.06	286.00	405.00		593.33	315.00	2,467.66	2,782.66	803.67	102,334.78
South Amboy	7,897	68,775.90	1,832.00	4,039.21	8,221.92	431.85	338.50		25.00	232.74	165.20	397.94	392.33	84,454.65
Salem	7,435	78,269.55	1,616.00	2,885.06	2,768.34	445.00	130.25	6.00	193.00			471.23	924.84	91,977.20
Pleasantville	5,887	87,616.60	893.00	2,165.62	3,938.33	1,671.01	57.00		10.00			1,873.47	23.35	98,248.40
Woodbury	5,801	59,314.23	1,200.00	4,000.00	6,500.00	1,888.87	100.00	343.05	17.50			575.71	445.43	76,548.50
Lambertville	4,660	31,039.31	1,012.00	1,410.98	1,416.39	233.50	55.50					404.20	23.07	35,702.95
Bordentown	4,371	28,861.78	817.00	2,704.69	6,583.92	663.00	871.00	26.50	717.50			720.46	516.79	44,107.07

CLASSIFIED REVENUES OF NEW JERSEY CITIES IN 1920. (TABLE I)

City	Population	Amusements	Trade and Mercantile	Pawnbroker, etc.	Transportation	Hazardous and Unhealthy Business	Advertising	Sewer and Street Opening	Theatre and Moving Picture	Health	Building.	Miscellaneous and Unsegregated	Total
Newark	414,524									$15,782.95	$49,439.22	$255,948.34	$321,170.51
Jersey City	298,103		7,584.50		$36,742.80			$5,763.00			13,867.00	5,893.00	69,850.34
Paterson	135,876			$13,665.00	1,420.00	$4,722.00	$2,438.85		$96.00		2,567.55	6,567.00	31,476.40
Trenton	119,289							1,016.00		5,313.06	2,119.50	38,916.52	47,365.08
Camden	116,309	885.00	6,450.00	1,640.50	337.50	1,236.55	1,243.50	4,732.00	1,202.70		7,005.45	2,050.51	26,783.71
Elizabeth	95,783				16,258.80			2,812.21	555.00			5,212.70	24,838.71
Bayonne	76,754					175.00						34,912.85	35,287.85
Hoboken	68,166		1,071.00	867.00	1,540.50	236.00	609.50	1,835.61	2,722.00	6,386.10	2,303.76	4,997.50	24,180.43
Passaic	63,841		1,988.50	1,254.42	1,775.04	960.00	120.00	1,538.00	552.00	840.00	5,104.40	2,978.00	19,310.36
East Orange	50,710	100.00		20.00	2,018.87	883.00			400.00			37,986.86	41,398.73
Atlantic City	50,707	8,253.00	132,404.82	6,932.50	25,977.50	5,051.30	767.00	12,512.38	Under Amusements	438.00	12,540.25	2,368.60	207,245.35
Perth Amboy	41,707				1,317 97						1,439.37	1,155.75	3,933.09
Orange	33,268		50.00	598.25	1,270.00				300.00			4,752.92	6,970.17
New Brunswick	32,779	910.00			375.00	248.00		186.00		75.50	736.00	1,685.00	4,215.50
Plainfield	27,700				580.83					153.00		7,361.50	8,095.33
Clifton	26,470		679.30	300.00		328.00		55.00	175.00		1,181.50	2,254.00	4,972.80
Garfield	19,381		1,455.00					1,425.50		985.70		1,526.00	5,393.20
Bridgeton	14,323	147.00	175.60	100.00	813.50	16.00		3,489.00	110.00			532.50	5,283.60
Long Branch	13,521											4,799.33	4,799.33
Asbury Park	12,400	20,607.45	26,600.40					615.00			769.00	619.75	49,211.60
Gloucester	12,162							89.00			423.50	1,916.58	2,429.08
Englewood	11,627	20.00	7.00	290.00	202.65						529.00	541.93	1,640.58
Rahway	11,042				290.75						422.00	1,543.00	2,255.75
Summit	10,174				442.10					462.00	677 00	1,090.85	2,671.95
Burlington	9,049	200.00						,76.00				10.00	286.00
South Amboy	7,897				116.85							95.00	431.85
Salem	7,435											445.00	445.00
Pleasantville	5,867										41.51	1,629.50	1,671.01
Woodbury	5,301	45.00	700.00	115.12	180.00			187.75	50.00		333.00	278.06	1,888.87
Lambertville	4,660											233.50	233.50
Bordentown	4,371											663.00	663.00

REVENUE FROM LICENSES AND PERMITS IN NEW JERSEY CITIES IN 1920. (TABLE V)

While the chief source of municipal revenue is, and probably always will be, taxes on real property, the study of the revenue possibilities in special business taxes may prove very profitable. Under certain circumstances, such taxes may be advantageously levied to raise additional funds or to lighten the burdens on real estate

and Permits." The variations here are a reflection of the facts brought out in other tables in the Appendix which show the actual license fees charged for almost every conceivable purpose in New Jersey cities and towns. We find Atlantic City, with a population one-quarter greater than Perth Amboy, having a revenue from licenses thirty-four times greater than the latter. When we consider the resort character of Atlantic City and the scale of fees charged there, the difference is understandable. There are other differences, however, that are only explainable by variations in scope and amount of licensing and that represent huge revenue possibilities if the officials choose to follow the example of their neighbors.

In an attempt to analyze these differences, Table V was prepared. The individual items from which the various totals of revenues from licenses and permits were made were distributed among eleven main groups, as follows:

1. *Amusements.*—Includes pool, bowling, dance halls, carnivals, but not theaters.
2. *Trade and mercantile.*—Includes all trades and mercantiles not shown elsewhere.
3. *Pawnbrokers, etc.*—Includes pawnbrokers, auctioneers, junk dealers, and peddlers.
4. *Transportation.*—Includes auto, jitney bus, horse-drawn vehicle, street car, taxicab, hack and express.
5. *Hazardous occupations.*—Includes all pursuits involving risk to the community, such as garage, blastings, gas tanks, explosives, firearms, gasoline pumps and tanks, and hoisting.
6. *Advertising.*—Includes bill-boards, signs, bill posting and distributing.
7. *Sewer and street openings.*—Also includes water.
8. *Theaters and moving pictures.*
9. *Health.*—All occupations involving inspections by health authorities. Milk and ice dealers, scavengers, pig raisers, cesspools and dump picking.
10. *Building.*—Also electrical and plumbing permits.
11. *Miscellaneous and unsegregated.*

Although the incompleteness of the original data has prevented the complete detailing of this table, enough is shown to form many interesting comparisons. For example, why did East Orange, population 50,000, get only $100 from amusement licenses while New Brunswick, population 33,000, received $910? Does Paterson have more pawnbrokers and auctioneers than Camden? Although the cities have nearly the same population, their respective revenues from this source were $13,665 and $1,640. And why did Jersey City get $36,743 from transportation fees and Paterson only $1,420? The most striking contrast is that of Atlantic City's revenues from trade and mercantile licenses, of $132,404 against the same item of $50 from the residential city of Orange. The difference is readily understood in this case because of the character of the two cities.

When it is considered that city administrators are largely amateurs, coming and going with political changes, and that few agencies of standardization and information like the Bureau are in existence, it is not surprising that there are the variations brought out in these tables; it is surprising that there is not more variation. This report is one of fifty published by the Bureau during the year which are intended to help officials toward uniformity of practice and scientific methods. Within a month of publishing the report, one mayor reported a complete revamping of his city's scale of license and permit fees, and said that this one report alone had been worth to his city more than their share of the cost of maintaining the Bureau.

The most important single conclusion reached in the preparation of these tables is that there ought to be a state-wide compulsory uniform system of municipal accounting, so that comparisons of this sort can be made regularly and currently by newspapers and citizens' organizations without the labor involved in this case. Figures should be comparable and accounts mean the same thing, thus enabling citizens to compare revenues and costs of their government with others, and one year with another. An enlightened citizenry is necessary for true democracy and sound municipal accounting will do much to sweep the cobwebs away.

Motor Service for City Work

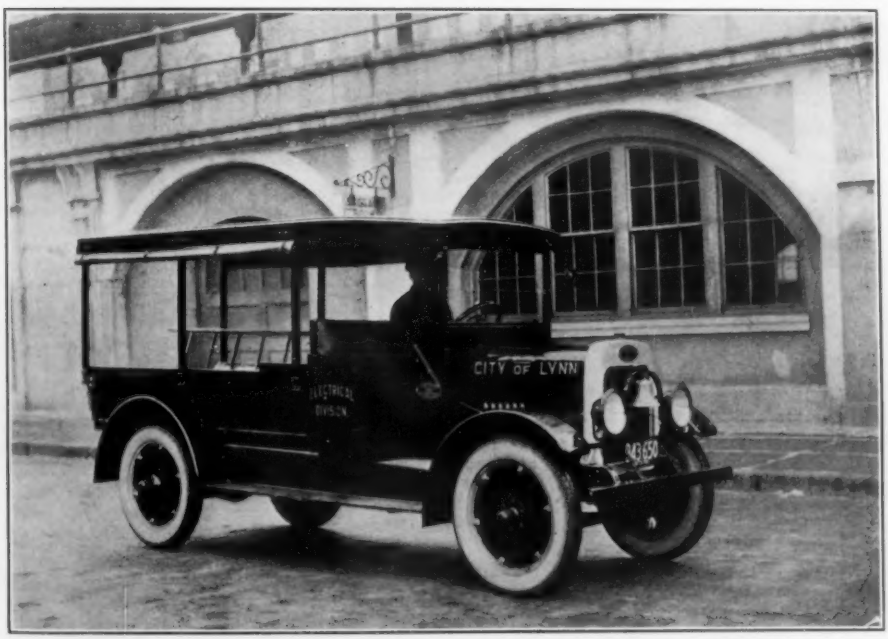
HOLT CATERPILLAR TRACTOR HAULING TROY TRAILERS IN THE CONSTRUCTION OF THE VICTORY MEMORIAL DRIVE BY THE BOARD OF PARK COMMISSIONERS OF MINNEAPOLIS, MINNESOTA

A BUCYRUS DRAG-LINE BACKFILLING ON THE WETHERBY SEWER, DETROIT, MICH.

Blaw-Knox collapsible steel forms are being used on this job by the contractors, Nash Brothers, Chicago, Ill.

AN AMERICAN-LA FRANCE ENGINE OF THE GRINNELL, IOWA, DEPARTMENT MAKES SHORT WORK OF A JANUARY FIRE

This truck carries a 65-gallon chemical tank, 3,500 feet of hose, two 50-foot ladders, one 40-foot ladder, one 10-foot roof ladder, and one 20-foot roof ladder



A GRAMM-BERNSTEIN SPEED TRUCK EQUIPPED FOR ALL-ROUND SERVICE IN THE ELECTRICAL DIVISION OF THE LYNN, MASS., FIRE DEPARTMENT

This truck answers all alarms to look after the wiring of the Fire and Police Departments

Concrete Pavement, Troy, N. Y.
Hard-n-tyte Road Treatment used.

Five years from now go out and try to find soft spots in *that* concrete!

HARD-N-TYTE
for
CONCRETE
and
MORTARS

For over twenty years the General Chemical Company has been at the forefront of chemical research and manufacture in this country. Hard-n-tyte is the latest contribution of its splendid staff of chemists. It is the successful result of long search for a concrete hardener that really hardens the surface and materially increases its life. It enables engineers and contractors to deliver a quality of concrete work far in advance of anything that has been possible heretofore.

Don't take my word for it—just watch that road stand up under traffic. Give it a good "going over" every six months. Don't just sit in your car—get out and walk, so you can see better. You've probably got a cold chisel in your tool box—take it out and see how much dust you can raise on that road with it. That's one way to find out what the Hard-n-tyte Road Treatment really does for a concrete road.

The other way is to do just as the General Chemical Company engineers did, and grind standard concrete road slabs, 1:2:3 concrete, for 1,800 revolutions in a Talbot-Jones rattler charged with 200 lbs. of iron shot. Half the slabs were treated with Hard-n-tyte, just as this road has been treated. Half of them were left untreated. When the test was finished, *the slabs treated with Hard-n-tyte showed 30% less wear than the others.*

Hard-n-tyte is the trade name applied to pure white crystals of magnesium zinc fluosilicate. When these crystals are dissolved in water and the solution flushed over a concrete road, the surface becomes flint hard. This condition is caused by the formation of insoluble and extremely durable silicates and fluorides within the concrete itself.

Hard-n-tyte is cheaply applied by common labor. Concrete roads treated with Hard-n-tyte wear like mosaic.

Send us your name and address and let us help you eliminate raveling, soft spots and ruts in the concrete roads you build this year.

General Chemical Company
1711 Broad Exchange Building, New York City

Hard-n-tyte Road Treatment

—makes concrete roads wear longer

When writing to Advertisers please mention THE AMERICAN CITY.

Chamber of Commerce Activities in Public Affairs

Summer Schools at Evanston, Ill., and Palo Alto, Calif.

The decision having been reached that the National School for Commercial Secretaries, established in 1921 under the joint auspices of the National Association of Commercial Organization Secretaries, the Chamber of Commerce of the United States, and Northwestern University at Evanston, Ill., is to be continued as a regular institution, the American City Bureau has announced its belief that the welfare of the profession can best be served by its withdrawal from the national summer school field.

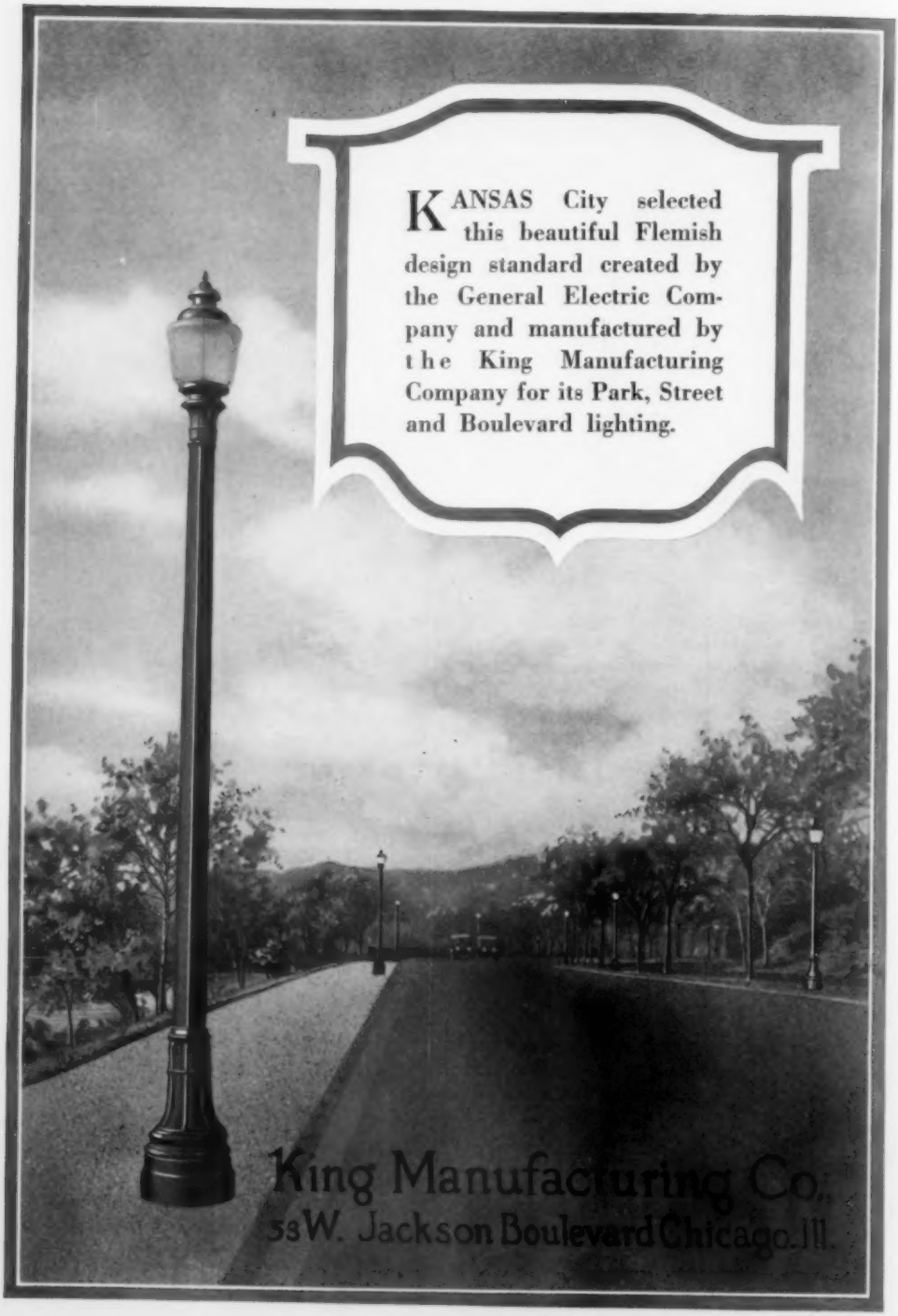
The Bureau has volunteered to place at the disposal of the Board of Managers of the National School its seven years of experience in the conduct of Summer Schools for commercial organization secretaries, and subscribes to the principle that the profession—which is now in a position to do so—should control the courses of training to be provided.

The National School, under the same auspices as last year, will be held at Evanston, August 21 to September 2 inclusive. To make Summer School training available for secretaries in the Far Western States, the Bureau's Western School of Community Leadership will be held at the same time at Stanford University, Palo Alto, Calif. For detailed information regarding the National School, requests should be addressed to the Chairman of the Board of Managers, Robert B. Beach, Business Manager, Association of Commerce, Chicago; and particulars of the Western School may be obtained from the American City Bureau, Merchants Exchange Building, San Francisco.

Community Advertising by Means of Films

San José, Calif.—The San José Chamber of Commerce, in November, 1920, was the first organization of the kind to present its annual report to its members and the community in film form, and it is now the first city in the United States to conduct a nation-wide publicity campaign by similar means. The latter idea is not strictly new, but in this case it has been utilized on so stupendous a scale that it is worthy of note. The Chamber's film report attracted attention throughout the country, and so great was the demand for use of the film that several prints were made and they are still being circulated in many western and eastern states. Encouraged by this success, the manager of the Chamber engaged the services of an expert film photographer and personally superintended the taking of pictures in all parts of the Santa Clara Valley, of which San José is the chief city, showing every phase of the valley's attractions and advantages, and making up a film of 2,000 feet, under the title, "Journeys Through the Valley of Heart's Delight." Several prints of this film were made, one of which is running daily in the California State Exposition Building at Los Angeles, through which a quarter of a million tourists pass during the year.

Since the film was produced, communications have been received from many of the largest distributing organizations in the United States offering to distribute copies to the public they serve, free of charge to the Chamber. The Photographic Department of the Ford Motor Company, after inspecting a print of the film, urgently requested 76 prints, to be delivered within three weeks. The big job of making the 152,000 feet required was completed in four weeks, and soon thereafter the prints were released through 32 Ford exchanges in this country to 2,500 theaters. The Ford people estimate that these prints will be seen by approximately 40,000,000 persons, so that at least 30,000,000 would be a conservative number. The 76 prints cost the Chamber $7,000 for the making, or about 4½ cents per foot, to which should be added about


KANSAS City selected this beautiful Flemish design standard created by the General Electric Company and manufactured by the King Manufacturing Company for its Park, Street and Boulevard lighting.
King Manufacturing Co.
53 W. Jackson Boulevard Chicago, Ill.

$500 for taking the pictures. The distribution costs the Chamber nothing.

The number of prints that could be utilized without further expense to the Chamber beyond the cost of production seems to be limited only by that organization's ability to finance the prints. Francis Holley, of the Bureau of Commercial Economics, Washington, D. C., has requested 20 copies; The National Non-Theatrical Motion Pictures Company asks for five copies; the Union Steamship Company of New Zealand offers to run the film in the best picture houses in New Zealand, Australia, England, India, and possibly South Africa; prints are being circulated by the Bureau of Visual Instruction of the University of Wisconsin, the University of Illinois and the University of California, and several other large distributing organizations stand ready to circulate prints as soon as they can be supplied.

ROSCOE D. WYATT,
Manager, San José Chamber of Commerce.

Auto Tourists Appreciate City's Hospitality

CORPUS CHRISTI, TEX.—Although Corpus Christi has for years been one of the most popular and well-patronized health and pleasure resorts of the Southern coast, until recently it was without a public camping park where tourists could camp while on their vacation.

The Commercial Association, after its reorganization in May, began to consider the advisability of establishing a free tourist park. A committee was set to work to ascertain how many tourists visited the city in automobiles and camped, and what percentage of them left the city because camp grounds were not afforded. The committee called into conference a number of business men and officials of the Rotary, Kiwanis and Automobile Clubs. The proposition was put up to the meeting and the survey read.

At this meeting it was decided that a fund of $600 would be raised to secure a five-year lease on a certain tract of land within ten blocks of the business section of the city and situated on and overlooking Corpus Christi Bay, and to equip it with toilets, water, electric lights, gas and other conveniences. The Commercial Association contributed $300, the Rotary, Kiwanis and Automobile Clubs $100 each, thereby subscribing the money necessary within thirty minutes. Plans had already been drawn, and work upon the new tourist park started the following morning, with the result that within a week after the committee meeting, Corpus Christi had one of the most complete and up-to-date free parks in the South.

The tourists have organized what is known as the "Tin Can Tourist Club" and hold meetings nightly, in the interest of sanitation, safety and comfort.

The city furnishes water free, the electric light company cuts its rates in half, and $200 maintains the camp grounds for a year. Corpus Christi's tourist traffic has already picked up 50 per cent, and local merchants declare their trade has advanced accordingly. It is conservatively estimated that the camp ground, which cost $800, including one year's maintenance, has in the first three months resulted in $60,000 being spent in the city which otherwise would have gone elsewhere.

J. C. CARTER,
General Secretary, Corpus Christi Commercial Association.

CORPUS CHRISTI, TEX., HAS JOINED THE LIST OF THOSE CITIES WHICH PROVIDE REAL HOSPITALITY FOR TOURISTS

Making School House Steps Safe

Architectural attractiveness was a factor—it was essential that every step be made slip-proof and safe—the steps had to be made durable—maintenance costs had to be eliminated—

The architects (Frost & Chamberlain) of the Worcester Girls' Trade School, Worcester, Mass., a beautiful $350,000 building, solved this stairway problem with ALUNDUM SAFETY TILE. The stairtreads are cast iron with steel risers. The cast iron tread is depressed to receive the tile which is set in cement mortar.

Thus every step in the building, two sets of stairways from shower baths to the top floor, are made slip-proof, trip-proof and wear-proof and the architects were able to get the desired harmonious effects.

ALUNDUM SAFETY TILE is manufactured by

NORTON COMPANY

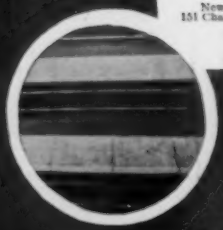
Worcester, Mass.

New York
151 Chambers St.

Chicago
11 No. Jefferson St.

Detroit, 233 W. Congress St.

T11



Elizabeth Chamber Backs Big Public Improvement Program

ELIZABETH, N. J.—The Chamber of Commerce is supporting a number of movements, which, if carried into effect, will mean important developments in the city. The Chamber encouraged and finally endorsed an elaborate plan of the Board of Works for the purification, widening and deepening of the Elizabeth River. The plan will cost about $3,000,000, and this expenditure might be distributed over a period of years without disturbing the value of the plans.

Having successfully sponsored a zoning plan, which was officially adopted by the City Council on February 6 for the city, the Chamber is now bending its efforts toward the adoption of a general city plan. A committee is at work on this proposition.

By organizing a new association known as the Union County Park Association and working under that name, the Chamber of Commerce Committee was instrumental in securing the appointment of a Union County Park Commission, which will develop parks and playgrounds throughout the entire county.

The Chamber is also active in protecting the interests of the city under the changes contemplated by the Authority of the Port of New York. The specific demands are that any alterations in existing conditions must keep the transportation facilities of Elizabeth as good as, or better than, they are at present, as upon transportation depends the continued growth of the city.

M. D. GRIFFITH,
Secretary, Elizabeth Chamber of Commerce.

Two Towns Unite to Provide Tourist Camp

ALBANY, ALA.—As a result of the activities of the Chamber of Commerce, public-spirited citizens of Albany and Decatur have fitted up a tourist camp.

This differs from most other such camps in that it is entirely enclosed and covered. The former "Bob Jones Tabernacle" was purchased, and fitted to accommodate fifty cars. All conveniences are provided, such as a gas stove for cooking, a coal stove for heating in cold weather, and running water. Inside the tabernacle, another room, 20 by 20 feet, is enclosed, which is comfortable even on the coldest days.

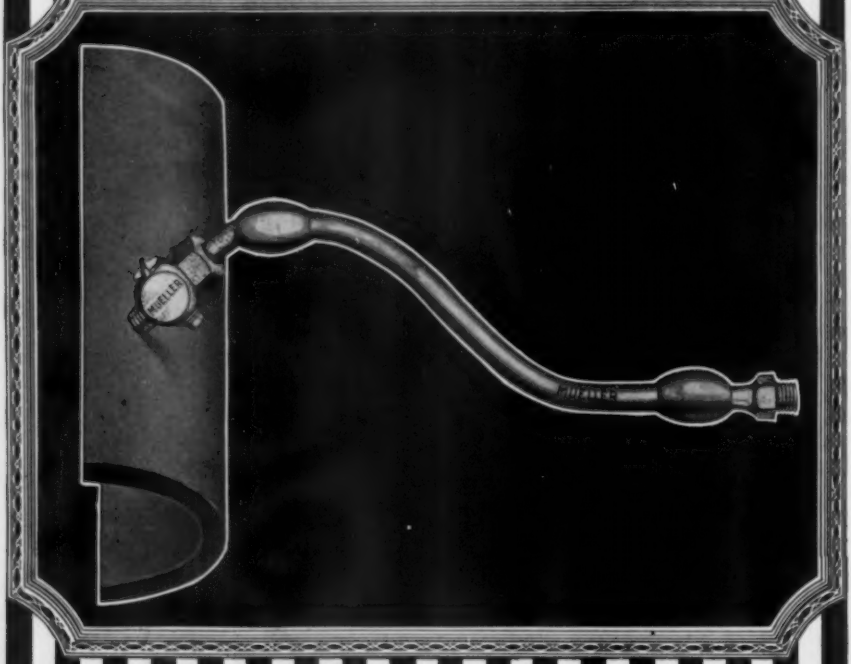
Under the name of the Albany-Decatur Community Club, the camp is supported by the citizens of both towns, funds for maintenance being provided by donations and subscriptions.

W. W. RAHN,
Vice President, Albany Chamber of Commerce.

AN INVITATION TO STAY OUT

AN INVITATION TO COME IN

The Chamber of Commerce of Springfield, Ill., has been active in making the second picture possible



MUELLER

Wiped Joint Goose Necks

Made in all sizes from ⅜ to 2"—with lead pipe 18 to 36 in. long—and come singly as shown and with 2, 3, 4, 6 and 8 branches—they are standard connections for service work.

The fact that the wiped joints are made by workmen who do this one thing well day in and day out insures uniform quality—and a better and less costly job than could be done on the ground.

Write for descriptions and prices.

H. MUELLER MFG. COMPANY. DECATUR. ILL., PHONE BELL 153

Water, Plumbing and Gas Brass Goods and Tools

New York City, 145 W. 30th St., Phone Watkins 5397 San Francisco, 635 Mission St., Phone Sutter 3577

Sarnia, Ontario, Canada

Mueller Metals Co., Port Huron, Mich., Makers of "Red Tip" Brass Rod; Brass and Copper Tubing; Forgings and Castings in Brass, Bronze and Aluminum; Die Castings in White Metal and Aluminum; also Screw Machined Products.

Telling the Public About Its Roads

JOHNSTOWN, PA.—The Johnstown Chamber of Commerce is conducting an educational campaign to interest the people of Cambria County in road construction. On the back of the Chamber letter paper is a county road map, the roads being printed in different colors. By means of the key, one can quickly see what part of the county program has been finished, what is under construction, and by whom and at whose expense the work is being done. Purple lines represent county aid roads near completion; red lines, state aid roads in process or completed; green lines, state aid roads applied for by the County Commissioners; and yellow lines, roads for which county aid has been applied for by the Supervisors.

Cambria County is in a mountainous district in the heart of the soft-coal region. Its good roads program got a late start, but there are now 115 miles of hard roads finished and enough funds available to complete a comprehensive program reaching all centers of population or industry.

JOHN E. GABLE,
Managing Secretary, Johnstown Chamber of Commerce.

Turning Waste Space Into a Memorial Park

CALUMET, MICH.—The Keweenaw Peninsula has long been known for its wild life, its scenic beauty and its copper mines, yet the district has been lacking in parks made and maintained in the cities and towns of the little wonderland.

At Calumet, which is the metropolis of the district, the mines are segregated from the town by a field of 17 acres. This space was made after the town had been destroyed by fire half a century ago. Residents of Calumet at that time believed that the space between the mines and the town would prevent the spread of another fire.

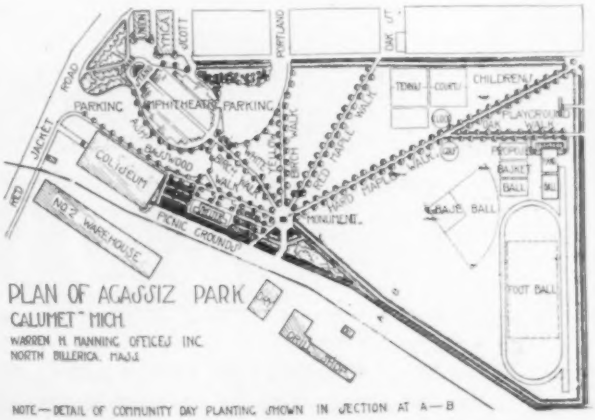
For years this open space was used as a baseball field and playground. Over a year ago the mining company engaged a landscape artist to build a park on the ground in memory of the founder of the mines, Alexander Agassiz, the famous geologist.

The sketch shows the park as it will appear when completed. In the center of the circle from which all lanes lead will be a large monument of Mr. Agassiz, and the pathway will be lined with birch, maple, elm and oaks. The exterior trees are evergreens from the forests surrounding Calumet, and the interior rows are poplars. Wild flowers and shrubs will be planted along the outside of the park parallel with the evergreens, and cultivated flowers will be planted in the interior, where they will receive more sunshine.

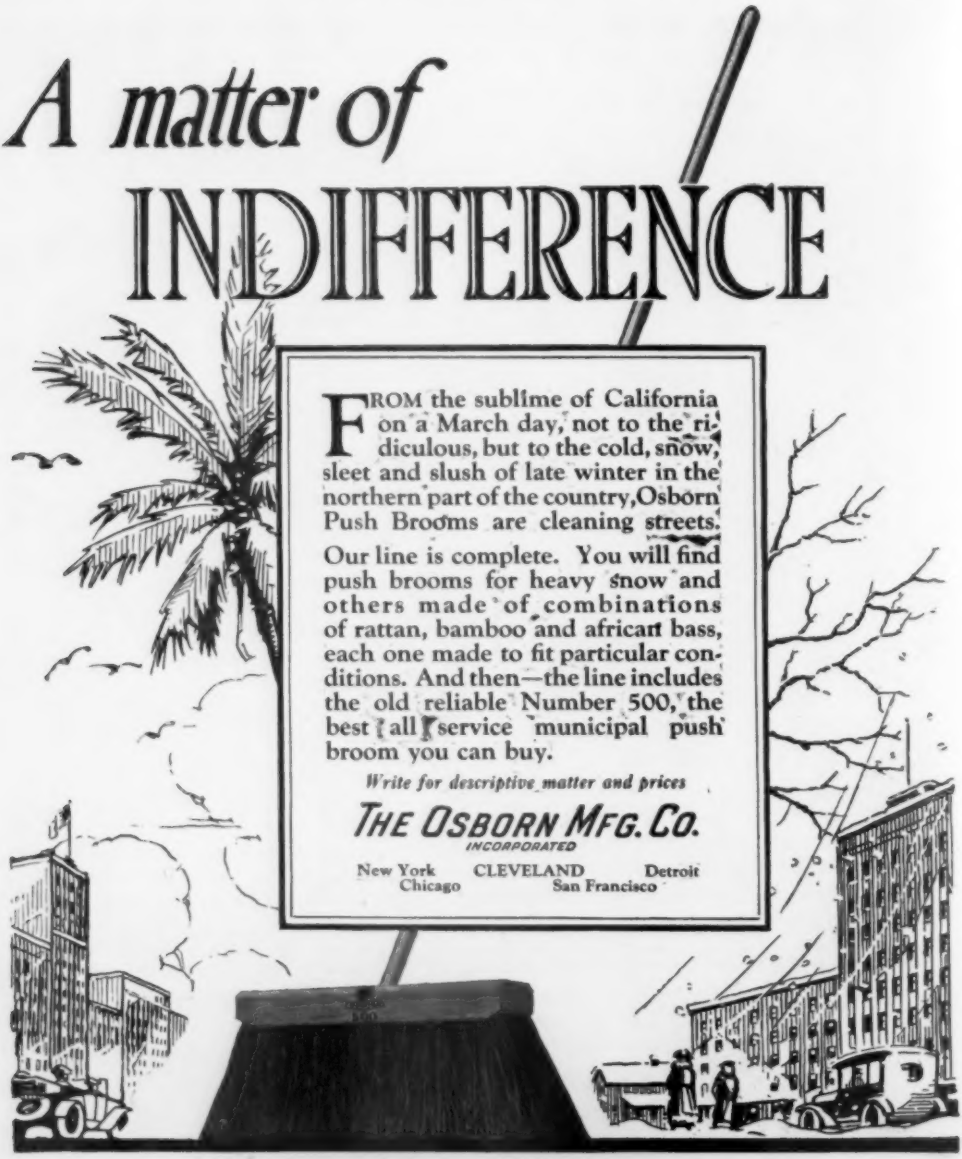
The park will be thoroughly supplied with modern equipment. A large gridiron and baseball diamond is planned for the northern end to take the place of the present field. An amphitheater and a band-stand will be erected at the southerly end near the Colosseum, which is one of the largest ice skating-rinks in the country. Near the band-stand will be an auto park large enough to accommodate several hundred automobiles. A picnic shelter and numerous tables are planned.

The Calumet Chamber of Commerce is planning a Community Planting Day at which all school children in Calumet will be allowed to bring cultivated and wild flowers to plant in the park. The planting will be attended to by citizens of the town, and after the work is done the children will be allowed to take care of their own plants and study the growth.

G. T. MURPHY,
Secretary, Calumet Chamber of Commerce.



A matter of INDIFFERENCE



FROM the sublime of California on a March day, not to the ridiculous, but to the cold, snow, sleet and slush of late winter in the northern part of the country, Osborn Push Brooms are cleaning streets.

Our line is complete. You will find push brooms for heavy snow and others made of combinations of rattan, bamboo and africant bass, each one made to fit particular conditions. And then—the line includes the old reliable Number 500, the best all service municipal push broom you can buy.

Write for descriptive matter and prices

THE OSBORN MFG. CO.
INCORPORATED

New York Chicago CLEVELAND San Francisco Detroit

OSBORN

BRUSHES BROOMS

LARGEST MANUFACTURERS of INDUSTRIAL BRUSHES AND BROOMS

Americanization in Rochester

ROCHESTER, N. Y.—The Rochester Chamber of Commerce organized a Council for Better Citizenship in 1920. One of its aims is to impress upon the new citizens their privileges and responsibilities and to interest the native-born in his new brother. The Council consists of five committees: New Citizens Committee, Service Bureau Committee, Education Committee, Legislation Committee and Racial Advisory Committee.

The members of the New Citizens Committee appear at court on naturalization days and greet the newly-made citizens. During the year five big dinners are given at the Chamber, to which the new citizens are invited. Here the Chamber members mix with the new citizens in the proportion of about two or three to six. Exercises are held and the final certificates of citizenship delivered. In 1921 over 1,370 new citizens were greeted, and of this number about 1,000 attended the dinners.

The Service Bureau during 1921 maintained a central office at the Chamber for the help and information of the foreign-born. Also three part-time offices were run at local centers one evening a week in the schoolhouses. During the year there were over 5,000 callers at the Bureau. Assistance was extended in about 400 instances to families or individuals who needed help in reuniting families. Other service included information as to citizenship papers; translating letters; encouraging the learning of English; directing unemployed; obtaining money on undelivered money orders, unused steamship tickets, and twice-paid bills; tracing telegrams and express shipments; and correspondence with American consuls and state department officials.

The Education Committee recently conducted a "Learn English" drive. In the Chamber, 250 teams were formed, consisting of one Chamber or Council member and an interpreter or team-mate. The pledges taken covered promises to join a class in English or citizenship. Reports show that approximately 2,000 pledged themselves and that already half of these have registered in classes.

The Racial Advisory Committee has conducted "Know Your Country" meetings in foreign sections of the city. Speakers and entertainment are provided. During the fall of 1921 over 9,000 persons attended the 12 meetings held; and 6 more meetings with an attendance of approximately 5,500 were held in January, 1922. The report for the year shows that there were more than 20,000 personal contacts.

Miss M. E. Bingeman, Secretary of the Council for Better Citizenship, is the directing force, under the supervision of the General Secretary of the Chamber. No other movement or enterprise in Rochester has such a command upon the time and energies of the best and most active men in the Chamber and among the citizenship in general, and no other inspires such enthusiasm as does this undertaking.

The Council's plans for the future are ambitious, among them one that will follow up the work in the past to see just what the effect has been. The idea is not to keep any surveillance over new citizens or foreign-born, but merely to continue the friendly relationship and practical assistance which makes for confidence and community good-will.

JULIAN KILMAN,
Federal Naturalization Examiner.

The "Made and Trade in Brockton" Exhibit at the Brockton Fair

BROCKTON, MASS.—Any community wishing to give itself a boost will do well to read the chapter just written by the Brockton, Mass., Chamber of Commerce in connection with the big "Made and Trade in Brockton" exhibit at the Brockton Fair.

This exhibit has brought Brockton manufacturers and merchants into an intimacy of business relationship which has greatly benefited the city's industrial and commercial life. Manufacturers have learned, through the various displays, that they can secure made-in-Brockton materials which heretofore they have purchased outside the city. The same is true of the merchants, who, as a result of the exhibit, now know that there are local manufacturers who can supply their needs in sundry kinds of merchandise. For example, one of our shoe manufacturers, employing more than 3,500 operatives, learned from one of the displays that another Brockton manufacturer made shoe accessories. The shoe manufacturer immediately placed a large order with his fellow business man. Of Brockton's annual business of $125,000,000, it is estimated that at least $30,000,000 goes for purchases from outside sources. It is our intention to

Dundee Road, Elgin Township, Elgin, Ill., gravel macadam maintained with "Tarvia-B"

Typical Spring conditions on a soft-surfaced road.

Save the *old* roads--- then on with the *new*---

Every Spring finds scores of communities inaugurating systematic programs of salvaging the roads already built—putting *them* in shape to handle the growing traffic before new construction is begun.

The economy of such a sound Good Roads Program appeals to taxpayers everywhere.

How about the roads in your community? Quite likely the old, worn-out macadam that you have thought worthless can be quickly and cheaply restored to usefulness by a traffic-proof Tarvia top.

There may be other stretches that need nothing more than the time of a patrol crew to patch them with "Tarvia-KP"—or a simple treatment of "Tarvia-B" to preserve the surface and make it traffic-proof and weather-resisting.

Tarvia roads are mudless, dustless, waterproof and automobile-proof 365 days in the year. Their low first cost and economy of maintenance places good roads and their many advantages within reach of the most modest community.

Illustrated booklets descriptive of the various Tarvia treatments free on request.

Tarvia
For Road Construction Repair and Maintenance

Special Service Department

This company has a corps of trained engineers and chemists who have given years of study to modern road problems. The advice of these men may be had for the asking by anyone interested. If you will write to the nearest office regarding road problems and conditions in your vicinity, the matter will be given prompt attention.

New York Chicago Philadelphia Boston
Detroit New Orleans Birmingham Kansas City
Peoria Atlanta Duluth Milwaukee
Youngstown Cleveland Columbus Richmond
Rochester Houston
THE BARRETT COMPANY, Limited: Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S.

The Barrett Company

St. Louis Cleveland Cincinnati Pittsburgh
Minneapolis Buffalo Syracuse Salt Lake City
Bangor Washington Indianapolis Lebanon
Providence Rochester Elizabeth Kansas City
Dover

LOOKING DOWN THE AISLE OF THE EDUCATIONAL BUILDING OF THE BROCKTON, MASS., FAIR

increase the volume of at-home purchases until possibly one-half of the $30,000,000 can be retained in this city.

Brockton is a natural trading center for 250,000 people. More than 300,000 people attended the Brockton Fair. Practically all these visitors at one time or another during the four days of the Fair turned their steps to the Educational Building. It was in this great structure, containing some 50,000 square feet of floor space, that the "Made and Trade in Brockton" exhibit was presented.

Brockton is known far and wide as "the city where they make the shoes"; naturally, the shoe industry played a leading part in the exhibit. In miniature, the Brockton District shoe industry was shown in actual operation—workers at their machines producing made-in-Brockton shoes. Each machine was driven by an individual electric motor. Visitors were privileged to witness in action all the various operations which go to make a pair of shoes.

Possibly the outstanding feature of the entire exhibit was the "Style Show and Trade-in-Brockton" exhibit, in which the manufacturers and merchants combined. Brockton is the first city to present a Style Show in connection with an agricultural or county fair. It has proved to be one of the most novel of these displays ever held. The runway for the 40 models is the largest in the country, permitting displays of shoes and garments being put to the actual use for which they were manufactured—dancing, tennis, golf, etc.

While it is admittedly difficult to trace results directly to the Fair displays, local business men have stated that from unsolicited quarters orders and new business have come to them which are clearly the result of their advertising at the Brockton Fair.

This trend of affairs, which may be taken to imply more business in the future as the "Made and Trade in Brockton" exhibit grows in size, quality and reputation, quite naturally interests the exhibitors, who at first held to the belief that they could hope for no results other than of doing their part as citizens to make the Fair bigger and better. It has also been most encouraging to the committee in charge, the members of which are approaching this year's exhibit with renewed confidence both in the quality of the show to be staged and the commercial results which will follow.

FRED E. HILTON,
Secretary, Brockton Chamber of Commerce.

HOLLOWSPUN
Lighting
Standards
ESSEX County, New Jersey, has used Hollowspun reinforced concrete lighting standards both for the court house in Newark and for park lighting at Nutley. Our new catalog supplement No. 9, containing full information on this type of standard will be sent on request.
Massey Concrete Products Corporation
Peoples Gas Bldg., Chicago

Street Markets in the United States

By Caroline B. Sherman
U. S. Bureau of Markets and Crop Estimates

THE picturesque street markets found in some of our small American towns compete with European market squares in individuality and charm. The exploring traveller comes across them in unexpected places and finds a day spent in one of them full of interest and local color.

The street markets in Benton Harbor and St. Joseph, Mich., constitute an interesting development. These cities are surrounded by many extensive vineyards, and the large number of growers probably had an important bearing on the establishment of the type of market at these points, for while in neighboring counties cooperation in marketing has developed among the grape growers, in the street markets of Benton and St. Joseph there is an extreme development of competition among buyers.

A Grape Market

Each day the farmers drive in to certain crowded street corners with wagon-loads of grapes—nothing but grapes. Informal regulations are tacitly agreed to—the farmers' wagons form in lines at these corners, and no buyers pass beyond the lines. The buyers crowd around each wagon as the line moves up, and each makes a bid; the highest is usually accepted. Sometimes when buyers have car-loads or boat-loads nearly complete for shipments, bidding is very brisk. But if the farmer thinks he can secure larger returns by consigning his load by freight or express to some city market, he refuses even the highest bid and drives on independently to the railroad station.

There is much controversy in this region as to whether the returns from cooperative associations or from street sales net the greater profit to the grower. Study shows that naturally the output of the associations maintaining inspection brings the higher average prices, but that the street prices usually reflect very closely the daily quotations from the tributary terminal markets.

A Social Market for Broom-Corn

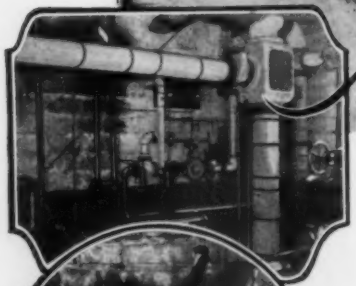
The farmers of the broom-corn section of Oklahoma are not so sure of the competitive conditions in the street market of Lindsay, which is devoted exclusively to the sale of broom-corn. But here they bring their product year after year, many of them pressing neighbors and neighbors' teams into service, that they may take their entire crop to this market on a single day. So short is the broom-corn season that this crop has often been harvested by dint of night work with shifts of "broom-corn Johnnies," as the immigrant labor that drifts into this region at harvest time is locally known.

In Lindsay at the height of the broom-corn season the streets are filled from curb to curb by ten o'clock in the morning, and often before that time. Many haul at night in order to get a good location where they can more readily attract the attention of buyers.

Days on this market vary greatly. There are times when buyers are everywhere in evidence, passing from wagon to wagon, examining the bales, sampling the corn and dickering with the farmers. When bids are made by buyers, they are usually considered binding for the day, and the farmer usually stays on to see if he can secure a higher bid. Hundreds of buyers come to Lindsay each year representing manufacturers, wholesale dealers and commission houses.

Roanoke, Va., is planning a modern enclosed market building with steel sheds to shelter growers' wagons, but there are those who will regret to see the passing of the old market square. Here near the center of the city, on land donated for the purpose, every type of farm wagon congregates to offer its simple wares, from the prairie-schooner of the mountaineer to the one-mule team of the local negro. One wagon may be filled entirely with corn in the husk, another with the unsorted apples of the small backwoods farm. Others have well-assorted first-class produce attractively displayed in convenient containers. Here and there are baskets bright with field flowers or the nosegays from old-fashioned gardens —goldenrod, asters, phlox, marigolds and

What One Town Did Another Can Do



Main Street, Arcade, N. Y., showing some of the buildings heated by steam from the Electric Light Plant.

Interior and Exterior of Municipal Light and Heat Plant, Arcade, N. Y.

Circular insert shows main leaving Light and Heat Plant for School Buildings, across the street.

"COMMUNITY Water Supply," "Community Electricity," "Community Gas," are so commonplace you give them no more than a passing thought. Are you equally familiar with "Community Heating?"

Arcade, N. Y. heats the business buildings and the schoolhouse, using exhaust steam from the municipal electric light plant. The system will fully pay for itself in a very few years, and then will return about $5,000 net profit per year from a product formerly wasted.

But the profit is *greater* than this! There are reduced insurance rates, lessened fire risk, freedom from furnace-tending, no coal deliveries or ash collections.

For 40 years we have been installing "Community Heating" Systems for Industrial Plants, Institutions, groups of residences, distributing steam through mains like water, gas, electricity; paid for similarly by meter.

Write for complete data regarding cost, operation and profits. Is there exhaust steam being wasted by any plant in your neighborhood?

Ask for Bulletin No. 20-AC on "Adsco Community Heating." Bulletin No. 158-AC describes "Adsco Heating" for individual buildings; Name of your architect appreciated.

AMERICAN DISTRICT STEAM COMPANY

GENERAL OFFICES AND WORKS
NORTH TONAWANDA, N.Y.

Branches:

First National Bank Building
CHICAGO

30 Church Street,
NEW YORK

Hoge Building,
SEATTLE

ADSCO HEATING

THE SIMPLEST KIND OF MARKET, WITHOUT STRUCTURES—SUITED TO THE NEEDS OF TOWNS AND SMALLER CITIES

coreopsis. Gay advertising umbrellas are in marked contrast with the quaint hoods of the large farm wagons, even as the gay bandanna on the head of an old-time negress emphasizes the decorum of the faded sunbonnet of the mountaineer. And in addition to its pictorial quality, this is said to be one of the most successful curb markets.

Whether devoted to the single product of a one-crop region or to the flotsam and jetsam of many farms run by diverse people, these and other unique market centers, developed by local custom through the years, constitute increasingly important commercial features of American cities.

Why Zoning Pays

Zoning sells a town. An unzoned town is like a dead stock of goods on the shelves.

Zoning is a flexible harness in which city expansion works; it may be adjusted in case it galls or frets at any point.

Zoning will flatten out the human pyramid, which congestion has created in a crowded portion of the city.

Zoning substitutes method for chance, symmetry for confusion, progression for patchwork, and order for chaos in city development.

Zoning affords for the poor man such security from nuisances and invasions as the rich may provide at great expense.— Charles B. Ball in the Chicago City Club *Bulletin*.

The

Recognized Textbook on Playground Planning—

This 128-Page Medart Catalog is recognized everywhere as a text-book on Playground Planning and Installations. It shows in detail just what apparatus is best suited for boys, for girls and for smaller children. It shows ideal playground layouts, where cost is secondary to service and it shows, too, what combinations are most desirable for smaller communities or centers where only a limited appropriation is available.

And, of course, it points out convincingly just why you should always specify Medart Playground Equipment.

Add this elaborate book to your library—it is an actual help to anyone interested in Playgrounds and Playground Planning. Sent promptly on request.

FRED MEDART MFG. CO.

Potomac & De Kalb, St. Louis, Mo.
New York San Francisco
52 Vanderbilt Ave. Rialto Bldg.
Chicago, 326 W. Madison St.

It will interest you to know that —

The right of a citizen to inspect municipal business, including records and data, has been upheld by the courts in the recent contest between the San Francisco Bureau of Governmental Research and the city of San Francisco.

In 1917, the Bureau wished to make an independent study of the Hetch-Hetchy project. Informal and formal requests for access to certain information relative to diamond drill borings, dam location plans, cost estimates, etc., were denied by the Chief Engineer. This position was supported by the Mayor and the Board of Supervisors. Suits were filed, one by the Bureau and one by the Secretary of the Bureau as a taxpayer.

The right of access was established by the decision, which orders that there shall be included within the writ of mandate for citizen inspection all preliminary estimates and details which form uncompleted data, even though such matters may not have been formally dignified by official sanction as public records; and further, that citizen inspection of records and "other matters" cannot be prevented on the ground that they are "confidential" by the circumstance of the City Engineer's having communicated them to the City Attorney.

Kenosha, Wis., adopted the city manager plan at the January election. The council, of five members elected at large for a term of two years, will choose the city manager for an indefinite term. Kenosha is the first city in Wisconsin to adopt this form of municipal government.

The municipal government of Paris, France, is seriously considering the possibilities of installing moving sidewalks. Prizes have been offered for the best designs, the competition being open until September 20 of this year. The greatest freedom is given contestants, though it is understood that it would be most desirable to have the proposed sidewalks underground, rather than on the surface. It is believed possible that some form of moving sidewalk can be designed with frequent stations through those sections now most congested with foot traffic, and giving transportation at a rate of about 10 miles an hour.

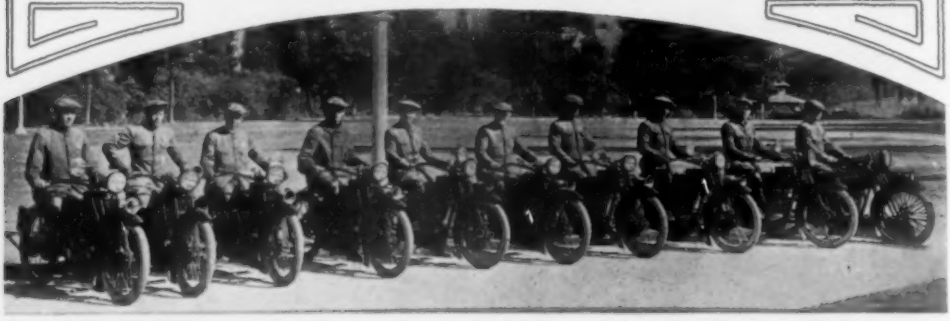
The City Planning Commission of Asheville, N. C., is undertaking the preparation of a comprehensive city plan. This will include a planning survey, general city plans and report covering: main streets and roads, with typical street sections, giving their width and subdivision; right of way for railroads and locations for stations; parks, playgrounds and other open spaces, with location, use and general character of development proposed; approximate locations of districts or zones for various classes of development with proposed restrictions; and locations for the principal public buildings.

The Montclair, N. J., Board of Health has extended the work of its laboratory to include the Wasserman reaction. This work will be under the direction of Helen G. Jacobs, B. S., who has recently been studying the technique of the test at the research laboratories of the New York City Health Department under the direction of Dr. William H. Park and Miss M. A. Wilson.

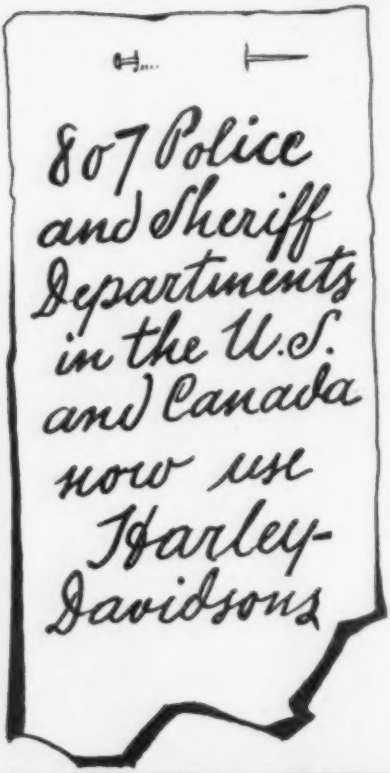
Hightstown, N. J., is making preparations for a comprehensive town plan, including studies in street extension, widening and improvement, zoning, parks and playgrounds, location of public buildings, and street tree survey. The work is being financed jointly by the town, the Board of Trade, and the Peddie Institute, a private school for boys, located in the community.

The New York *Times* states:

"Mayor Frank Pulver, of St. Petersburg, Fla., had a request from the St. Petersburg Purity League that he appoint a bathing suit inspector, a formal communication from the organization stating that the league 'intends to protect the married men from the wiles of the sea vamp.'"



—so Los Angeles Bought Four More



For years, motorcycles have been profitable and efficient members of Los Angeles County's splendid police department. But the Harley-Davidson did not join the force until early last Fall, when ten 1922 machines began to run down "motorized crooks," chase speeders and hurry relief and emergency calls.

So successful were these ten that on November 22, the Los Angeles County Police Department *bought four more Harley-Davidsons!*

Hundreds of cities, towns and counties find the Harley-Davidson not only indispensable, but a real profit-maker. It soon pays for itself by the additional revenue it earns for the police department, and its famed durability and economy of operation make it a profitable investment that lasts for years.

Ask your local dealer for free demonstration of the 1922 Harley-Davidson. Get the new, *lower* prices, and write us for special, illustrated literature on police use of motorcycles in many American cities. No obligation to you.

HARLEY-DAVIDSON MOTOR CO.
MILWAUKEE, WISCONSIN

Harley-Davidson
World's Champion Motorcycle

Hope for the City Jobless

By R. L. Foster

Major, Quartermaster Corps, U. S. Army; Publicity Director, The President's Conference on Unemployment

"THE problem of meeting the emergency of unemployment is primarily a community problem. The responsibility for leadership is with the mayor and should be immediately assumed by him."

This, in a paragraph, is the sum and substance of one of the most important recommendations of the President's Conference on Unemployment, to meet a nation-wide emergency. How well that emergency has been met can best be determined to-day by the reports from the various municipalities which have found themselves confronted with the serious situation of joblessness and business stagnation, and the more poignant one of acute suffering and bitter distress.

The Conference is concerned mostly with methods. Thinking persons did not expect the nation's unemployed to be restored to a job in some miraculous fashion, but one big thing was accomplished—the Conference did stimulate a sense of community responsibility of such nation-wide proportions that to-day there are hundreds of cities and towns in every state in the Union reporting to the working committee in Washington. They tell that they have the situation in hand, either by having an organization to meet it or by so speeding up business and industry as to provide some sort of employment for every man to whom joblessness might mean hunger and cold, or worse.

The peak in unemployment is ordinarily reached in mid-winter. The President's Conference took time by the forelock and spurred on the more sizeable communities to a full realization of the task ahead of them. It recommended:

"The basis of organization should be an Emergency Committee representing the various elements in the community. This committee should develop and carry through a community plan for meeting the emergency, using existing agencies and local groups as far as practicable. One immediate step should be to coordinate and establish efficient public employment agencies and to register all those desiring work. It should coordinate the work of the various charitable institutions. Registration for relief should be entirely separate from that for employment."

To-day we find that the average municipality is accordingly prepared for this work, because it visualized ahead of time the problem of finding work for idle but willing hands to do. The President's Conference on Unemployment is responsible for this preparation. To the cities of the country must go the praise and credit for the accomplishment.

In a general way their achievements are something to be proud of. There are exceptions, but the far greater majority did something—they sold municipal bonds and speeded up public work; they organized workmanlike committees headed by the mayor, and created jobs for the jobless; they helped local industries by staging sales of home-made products; they set projects going in winter which are generally put off until spring or summer; they raised substantial sums to buy meat and groceries, to pay the rent, to bring medical care, to put shoes on children's feet, to furnish shawls and overcoats and woolen socks.

As a result, the progressive cities of the United States are to-day in a position of readiness to take full advantage of the opportunities which will soon be theirs in the improved order of things, and at the same time they have demonstrated in the best possible manner their concern for the unemployment of the home town folks.

Referring again to the recommendations of the Conference, the cities united in agreeing that the relief of unemployment was a local problem; that it must be borne by local authorities and citizens. From Washington came the news to all of them that the Conference had originated a clearing-house for the exchange of information, while it urged the commencement of public projects, no matter how tight the money market or severe the winter weather.

And the cities have "come across." There are still thousands of unemployed, but their army would have been greater had the Conference never been held. Those who criticise its work because we have not reached a Utopian world, where everybody has pre-

The 12 Hour Underwriters' Test—How Made and Why

The machine to be tested by the Underwriters' Engineer is required to pump continuously throughout the twelve hours. It must deliver its rated capacity in gallons against 120 pounds net pump pressure for six hours; half its rated capacity against 200 lbs. pressure for three hours and one-third against 250 lbs. for three hours. *Tests must be made drafting water.*

These tests are made to protect the purchasers of fire trucks against unreliable and over-rated pumpers, and to establish the value of a type. All future machines of the same make and type will be approved by passing a three hour test.

NORTHERN ROTARY PUMPS

"MORE GALLONS PER HORSE POWER"

The Pump That Made This Success

The Reo-Northern pictured passed the 12-hour Underwriters' test at 300 gallons' capacity and at the close of the 12-hour test, without stopping, delivered 344 gallons against 122 lbs. pressure for an additional 30-minute run. This established the Reo-*Northern* in the *approved class.* The Underwriters must give credit for Reo-*Northern* installations proportionate to its rated capacity—They wrote the specifications of the test, they made this test, they gave out the figures.

The Reo-Northern is a decidedly practical and effective fire truck for outlying districts of even our largest cities, as well as for smaller communities.

NORTHERN FIRE APPARATUS CO.

MINNEAPOLIS, MINNESOTA. U.S.A.

cisely the job he yearns for, may well pause to consider the immeasurably greater wretchedness and idleness we should be experiencing now had there been no Conference.

Its delegates did not do away with hard times by the mere waving of a wand, nor did they point the way to perfect prosperity at a high and lovely level. But they did relieve a lot of men and women who wanted a job—any kind of job—who would be roaming the streets to-day and half starving through the winter, if the Conference had not been held. Let us see how some of the cities have set about solving their own peculiar problems.

Creating Jobs

An "Odd Job Campaign" has seemed to many to be one of the sure-fire schemes. How were these desirable jobs created? For example, here are some city reports to Colonel Arthur Woods, Chairman of the Emergency Committee of the Conference:

Chicago has made a house-to-house canvass under the direction of the 23 battalion fire chiefs, to compel householders to remove from their premises all combustible material and refuse, as a fire prevention measure. This campaign has created many short-time jobs. The Women's City Club has divided the city into 35 districts, each in charge of a woman chairman, who devotes specified hours each day to getting jobs through its membership.

Dallas, Texas, took a church census of its 190,000 population, and each householder was asked if some special odd job—painting, carpentry, gardening, or cleaning—could be furnished the unemployed. A record was kept of the replies and addresses, with the result that a large number of days of work were secured for the most needy.

Kearny, N. J., has an agent out every afternoon, covering the town with several helpers, in automobiles. They visit buildings under construction, look over streets being paved, and call at all industrial plants and railroad shops, offering the cooperation of the local employment bureau, and ascertaining exactly what kind of help is needed.

Each ward in Rockford, Ill., has a committee with the two aldermen as chairmen. These committees in turn have organized precinct committees with a member in charge of each city block. Personal contact like this has resulted in a very successful campaign to provide jobs and relieve distress.

Fort Smith, Ark., has a rock-pile where men break big stones into little ones, to be mixed with cement and sand to improve the local streets. Gloucester, Mass., and Evanston, Ill., pay the jobless to chop down condemned city timber, which is sold for fuel.

Youngstown, Ohio, has sold municipal bonds and provides work in the city parks for men with families. They are divided into two groups, and work in two-week shifts. The election officials lent their machinery, and a day was set apart for the registration of the unemployed. Allentown, Pa., is continuing all public work regardless of weather conditions, and a special drive has been made to remodel store fronts in order to give work to builders. A "Cheap Homes Campaign" has also stimulated employment and solved the housing problem.

Pittsfield, Mass., has a "flying shovel squadron" which reports immediately to any citizen who telephones, and clears the snow from his sidewalk in a jiffy.

This is one way.

Bringing Man and Job Together

A second grouping of cities has succeeded by matching up the man and the job, with the least possible friction and delay.

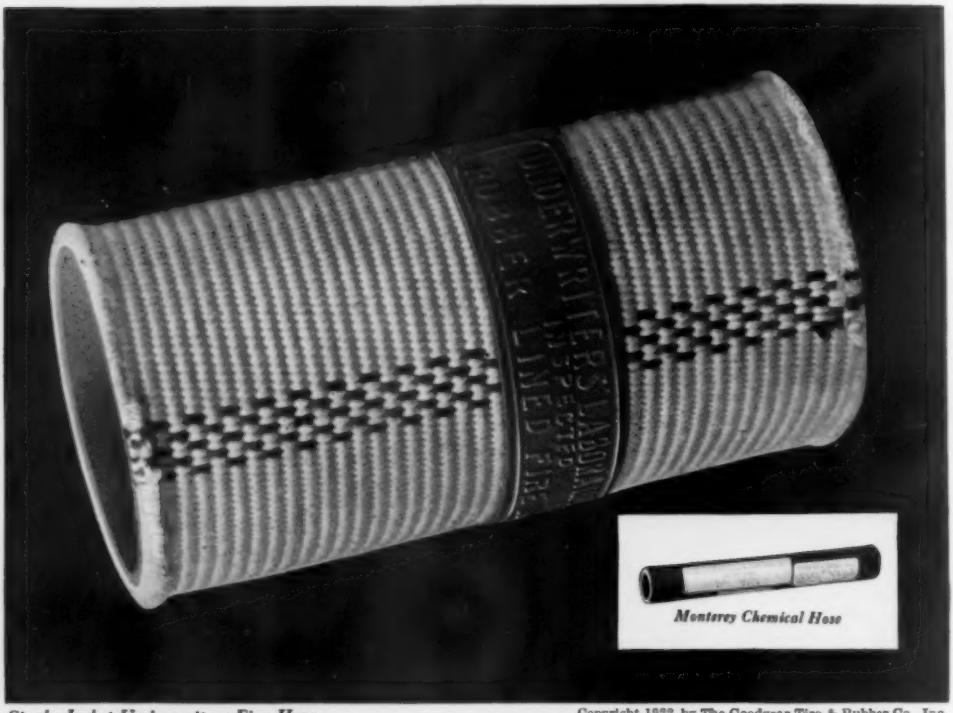
In Fort Wayne, Ind., advertisements were published in the newspapers, and the unemployed were asked to fill out and send in blanks. These were turned over to the local employment agency, and local industries secured the help they needed.

Schenectady, N. Y., has taken care of its own problem by bond issues for public improvements, and the city officials are enforcing rigidly such ordinances as snow removal, which is done under city supervision and charged on tax bills of all derelict property owners.

Atlanta, Ga., has formed a club of 500 citizens, each of whom has pledged the building of a dwelling to be rented at a reasonable figure, thus giving employment to many, and also helping the housing situation.

Boston, Mass., has asked all employers to increase the number of their employees by at least one, and as many more as is possible. New London, Conn., runs special entertainments in the theaters with local talent. The unemployed are allowed to sell tickets and retain a good percentage of the proceeds. Civil service rules are suspended in Cam-

GOODYEAR



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bridge, Mass., so that many persons may rotate in the same jobs.

Houston, Texas, maintains a gang of laborers ranging in number from 200 to 600, paying them $1.25 per day and, if they have dependents, supplementing this by charity. Employers are urged to apply to the city for labor, which is supplied from this gang.

Public-spirited citizens in Rock Island, Ill., have banded together to hire one man one day a week to keep him from becoming an object of charity. In Erie, Pa., a drive has been made to push the sale of "Erie-made" products, in order to provide local employment. Lima, Ohio, has put 100 men to work two or three days a week, paying them in orders on grocery stores for food. Butte, Mont., raises $60,000 each month, and extends some sort of aid to 2,500 families. Unemployed single men can get two meals a day of beef stew, vegetables, bread and butter, and coffee, out of this fund. Galesburg, Ill., has put $100,000 into water-mains, and work has gone on right through the winter, while the town provides lodging and food for the destitute.

Fort Dodge, Iowa, reports that jobless miners are working abandoned coal mines in the vicinity, which has given them a living and reduced the price of coal at the same time. Red Oak, Iowa, has opened a stone quarry and hauls the rock to the locations where it will be used in the spring.

Salt Lake City, Utah, has established a municipal wood-yard, where old railroad ties and discarded telephone and electric light poles are sawed into firewood by the unemployed, at 25 cents an hour. They are paid in lodging and meal tickets, and the kindling is sold.

Funds for Relief

A third grouping includes those cities which have appropriated funds, in addition to the regular budget, to relieve distress and suffering.

New Haven, Conn., is raising a community chest of $500,000, which includes an item of $50,000 for an emergency fund for the unemployed. In Hartford, Conn., small sums are advanced to unemployed persons on their notes in favor of the city for repayment. This keeps borrowers from being put on the pauper list and jobless workers retain their self-respect.

Indianapolis has had an audit of city funds, and, with $163,000 available, has commenced work on parks and streets, with a constantly increasing pay-roll of deserving men, which now aggregates 1,200. In addition, $120,000 was raised in four hours for the relief of the unemployed.

Cleveland's community chest organization raised its quota of $3,500,000 in one week, and it reports that enough more will be forthcoming to prevent extensive suffering in the present emergency. In Cincinnati, the City Council has appropriated $10,000 for the Mayor's Unemployment Committee.

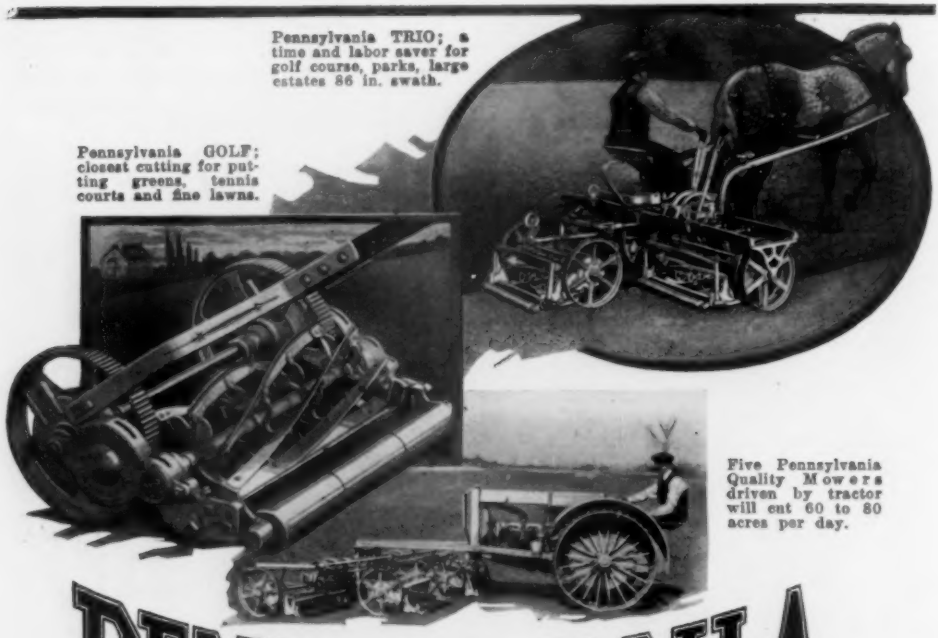
The Finance Committee of the Chamber of Commerce, Poughkeepsie, N. Y., will lend up to $100 to any unemployed man of reputable character, and accept his note for 90 days at reasonable interest charged to make up for any loss which may occur through failure to pay.

The City Council of Racine, Wis., has turned over $50,000 from its general fund to the central association for the needy, sick and unemployed. Applicants sign notes and are expected to repay when they get a job.

Buffalo has set aside $70,000 for groceries and other necessities for the relief of 1,113 families. Detroit is lending out of emergency funds $1,750,000 as necessity arises to applicants for relief, some of whom return it in work performed for the city. Kansas City has raised $290,000 in a charity drive. Boise, Ida., has opened a municipal wood-yard, where wages are not as high as the scale, but grocers have pledged themselves to supply food at cost to men who take this work, thereby making the money earned approximate the regular wage.

St. Paul, under an emergency clause in its charter, is authorized to borrow $100,000 to give employment to men with families, for sewer building, bridge repair, and snow removal. Other cities which have made appropriations for public works, because of the emergency, are: Los Angeles, Calif., $2,000,000; Savannah, Ga., $300,000; Baltimore, Md., $250,000; Dayton, Ohio, $500,000; Hazleton, Pa., $250,000.

With the Conference linking up the numerous municipalities in a nation-wide effort to combat idleness and relieve distress, with the municipalities backing the movement with patriotism, initiative, and full knowledge of conditions, is it not fair to assume that before many months have gone by, unemployment and its twin brother, unrest, will seem like a bad dream?



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The City's Legal Rights and Duties

Information for City Attorneys and Other Municipal Officers, Summarizing Important Court Decisions and Legislation

Conducted by A. L. H. Street, Attorney at Law

Ordinance Requiring Hospitals to Be Constructed of Non-Inflammable Materials Upheld Under the General Law-Making Powers of Charter

Under the charter granted by the general assembly to the city of Dublin, Ga., authority was granted to the mayor and aldermen to make and establish such rules, laws, ordinances, regulations, and orders as may to them seem right and proper, respecting all and every such matter and thing whatsoever "that may be by them considered necessary or proper or incident to the good government of said city, and to the peace, security, health, happiness, welfare, protection, or convenience of the inhabitants of said city, and for preserving the peace, good order, and dignity of said government." They were also granted therein all other powers necessary or incident to municipal government, not in conflict with any other special power or authority given said city. Held, that the powers above expressed were sufficient to authorize the mayor and aldermen to pass an ordinance prescribing that buildings to be used for hospital purposes should be constructed of brick or other non-inflammable material. (Georgia Supreme Court, Brigham et al. vs. Mayor and Council of City of Dublin, 108 Southeastern Reporter, 532.)

Advertising for Bids Prior to Resolution's Becoming Effective—Held Not to Make Proceeding Defective

In a case lately before the Iowa Supreme Court (Messer v. Marsh, 183 Northwestern Reporter, 602) it appears that the City Council at Jefferson, Iowa, adopted a resolution for the paving of certain streets. The Mayor was not present, but knew that the resolution was to be adopted and he did not veto it. Under the city's charter a resolution not signed or vetoed becomes effective at the end of 14 days. Before that period had expired, the City Clerk advertised for bids, pursuant to the resolution, and it was sought by plaintiff taxpayers to enjoin performance of a contract awarded under such advertisement, on the ground that the advertising was premature. Holding that there was no jurisdictional defect in the proceedings, the Supreme Court says:

"The Council had duly adopted the resolution of necessity, and thereby gained jurisdiction to make the improvement. The Council, by a unanimous vote, had passed a resolution ordering the construction of the improvement. In the same resolution in which the Council ordered the construction of the improvement, the Council also instructed the Clerk to advertise for bids. . . . One publication of the notice for bids was made before the resolution of construction became operative, which was not more than a mere irregularity, that did not deprive the city of jurisdiction to order the improvement."

Public Utility Company and Municipality May by Agreement Reduce Rates, But Burden Is on Municipality to Show Such Agreement

Speaking concerning rights under the municipal franchise of an electric lighting and power company, the Virginia Supreme Court of Appeals said in the case of Appalachian Power Company vs. Town of Pulaski, 108 Southeastern Reporter, 885:

"It cannot be fairly doubted, we think, that the municipal authorities and the company could, by agreement, amend the ordinance and reduce the maximum rate thereby authorized and no further or additional consideration to the company would be needed to support such an amendment other than the continuing privilege during the term of the ordinance to conduct its business thereunder. We have, however, a statute (Code 1919, sec. 3022) which it would be necessary to pursue if it were proposed to increase the rates authorized by such a franchise, but this statute would not preclude a decrease of such rates by mutual agreement. . . .

"The crucial inquiry in the case is whether or not section 7 of the franchise has been rescinded and the [lower] rates named in the communication of August 12, 1911, substituted therefor. This being claimed by the town, the

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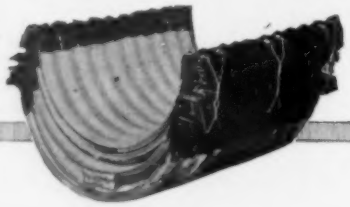

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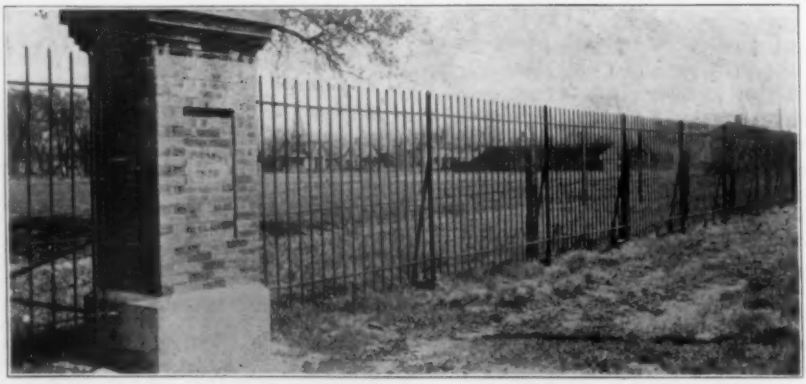

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burden is upon it to show that the franchise contract has thus been amended. Like other contracts, a franchise of this character cannot be amended without the consent of both contracting parties."

If Necessary for Purpose Primarily Intended, Proposed Authorized Bond Issue Will Not Be Enjoined Because Additional Incidental Purpose May Also Be Accomplished

A municipality will not be enjoined, at the instance of a taxpayer, from proceeding to issue bonds authorized to be issued for a given purpose (in this case to establish a water-works system) on the ground that another purpose (in this case operation of an electric light plant) will be incidentally accomplished, if the incidental object will not interfere with the accomplishment of the primary one. This was decided by the New Mexico Supreme Court in the case of Page vs. Town of Gallup, 191 Pacific Reporter, 460. The Court remarked:

"A municipality in its discretion may authorize its property to be used incidentally for a purpose other than that for which it is primarily purchased or constructed, if the use for incidental purposes does not interfere with the use for the primary purpose. . . . If it was true, as alleged in the answer, that the machinery which it was proposed to install was necessary for the present and reasonably anticipated needs of the town for pumping water, the fact that the town proposed to use the machinery in connection with some other municipal use could not operate to prevent the town from installing the machinery. A moment's consideration will demonstrate the unsoundness of appellee's position in this regard. It was a question of fact, of course, as to whether the machinery in question was necessary for the operation of the water plant, or whether the council in good faith had determined that it was necessary. Suppose, for example, that the court after hearing evidence had come to the conclusion that the said machinery was proper and necessary for such purpose. Would it have enjoined the town from installing it simply because the town proposed incidentally to use it in connection with some other use while not being used in pumping water? If so, then the town would be precluded from installing any kind of machinery or equipment that might be used incidentally for any other purpose."

Scope of Municipal Power to Furnish Public Service Beyond Its Boundaries

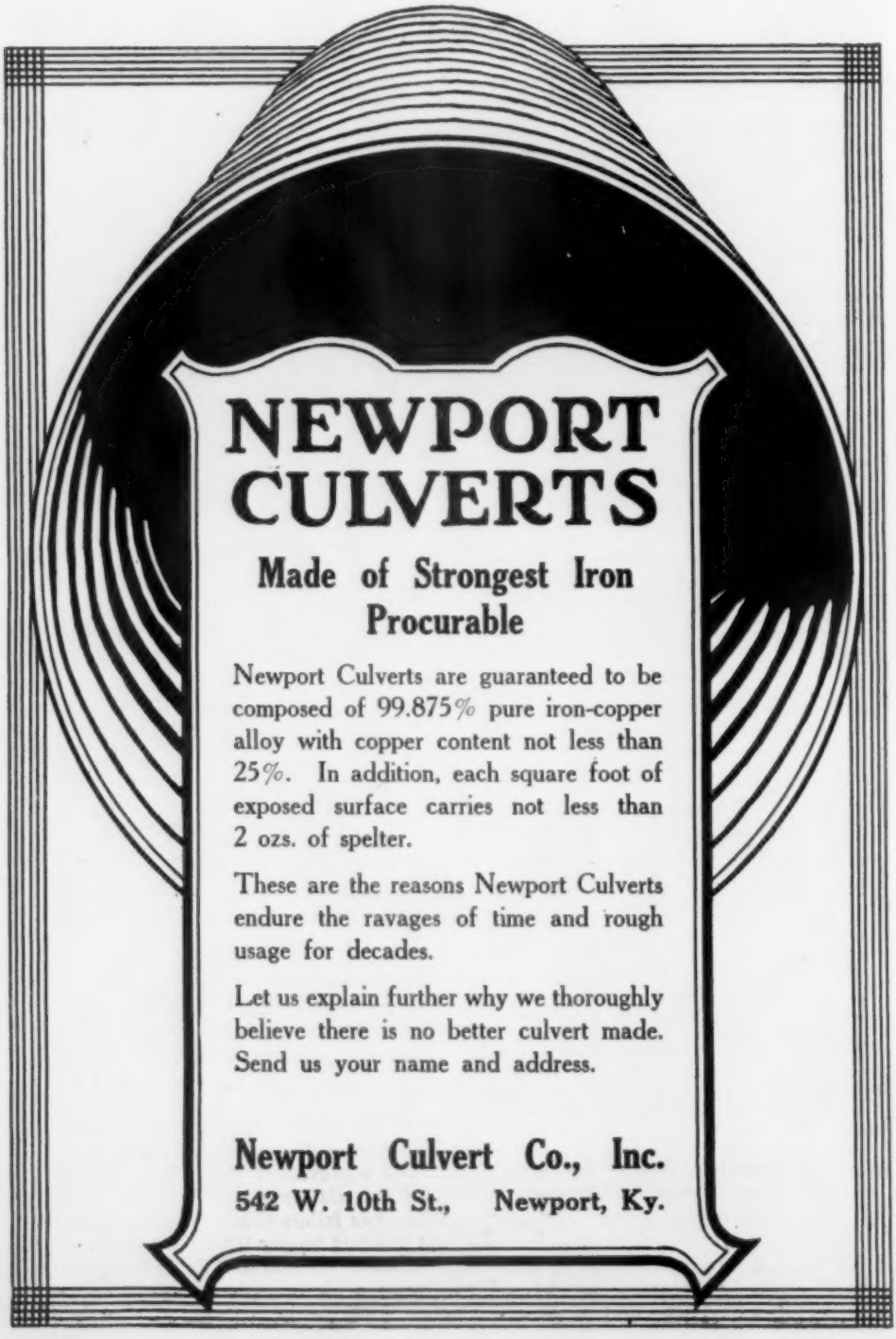
A city establishing an electric light plant was under a "duty to pay due regard to the future and provide for the probable necessities of a rapidly increasing population," holds the Utah Supreme Court in the case of Muir vs. Murray City, 186 Pacific Reporter, 433. And if, acting in good faith, a city has a large surplus of current, it may legitimately run a transmission line beyond its boundaries to a near-by city and sell the surplus. But the municipality cannot defend its action in exceeding its charter powers by engaging in non-governmental enterprises on the mere ground of profit. "Cities are not organized primarily for the purpose of engaging in commercial enterprises, however profitable they may appear or even prove to be." But while "cities are not organized primarily as profit-making concerns, yet when it is incidental, as in the instant case, to a proper exercise of its legitimate powers, the making of the enterprise a profitable one was highly commendable." And the Court adds that where money is borrowed for a corporate purpose and is profitably and judiciously expended, to the benefit of the inhabitants, the city will not be permitted to defeat liability on the loan through the circumstance that the transaction may have been somewhat irregular.

Combination to Prevent Competitive Bidding is Contrary to Public Policy

"It is the settled rule of the law that arrangements and combinations among prospective bidders for municipal contracts to prevent competition among themselves, and to bring about an award at a figure which is not the result of an honest competition, are contrary to public policy and void." This observation was made by the Texas Court of Civil Appeals in the case of City National Bank of Corpus Christi v. City of Corpus Christi, 233 Southwestern Reporter, 375.)

City Not Liable Under Provisions of Contract Where Contract is Void by Reason of Not Being Awarded to Lowest Bidder

A contract for a street improvement being void because not awarded to the lowest bidder, as required by the municipal charter, the city cannot be held liable under a provision in the contract, to the effect that the improvement should be paid for out of a special assessment fund, but that on the city's failure to make a valid assessment it should become liable. (Oregon Supreme Court, Montague-O'Reilly Company v. Town of Milwaukee, 199 Pacific Reporter, 605.)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SEWERAGE AND SEWAGE TREATMENT

Harold E. Babbit, Professor of Municipal and Sanitary Engineering, University of Illinois. John Wiley & Sons, Inc., New York. 1922. XII + 531 pp. Tables, diagrams and illustrations. $5.

A very thorough treatise on the subject, prepared by a teacher primarily for instruction purposes, covering the entire fields of sewerage and sewage treatment. It contains reports of tests on leaping and overflow weirs performed at the University of Illinois and not published elsewhere. The leading chapters cover the work preliminary to design, the computation of quantity of sewage, the hydraulics of sewers and design of sewerage systems and their appurtenances, pumps and pumping stations, materials for sewers, design of the sewer ring, contracts and specifications, construction and maintenance of sewers, sewage and its disposal, with special reference to disposal by dilution, screening and sedimentation, septicization, filtration and irrigation, activated sludge, acid precipitation, lime and electricity and disinfection, the disposal of sludge, and the use of automatic dosing devices.

CONSTRUCTION COST KEEPING AND MANAGEMENT

H. P. Gillette and R. T. Dana, members American Society of Civil Engineers. McGraw-Hill Book Company, Inc., New York. 1922. First Edition. XVII + 572 pp. Charts, diagrams and illustrations, $5.

A book intended to assist engineers, contractors and superintendents in reducing construction costs to a minimum through the science of management, cost keeping and forms. Specific chapters are devoted to the laws of management, the rules for securing minimum costs, piece rates, bonus and other systems of payment, measuring the output of workmen, cost keeping, bookkeeping for small contractors, office appliances and methods, and miscellaneous cost report blanks and systems of cost keeping.

SEWERAGE AND SEWAGE DISPOSAL

Leonard Metcalf and Harrison P. Eddy, Consulting Engineers, Boston, Mass. McGraw-Hill Book Company, Inc., New York. 1922. First edition. XIV + 598 pp. Tables, diagrams and illustrations. $5.

While not a successor to the valuable three-volume treatise, "American Sewerage Practice," published in 1914 and 1915, this book contains much later data and valuable material based on the rapid advance of sewage treatment practice since 1914. A book most heartily to be recommended to new students of sewerage and sewage treatment processes, and a valuable reference for any municipal library.

THE COMMUNITY

Edouard C. Lindeman, Professor of Sociology, North Carolina College for Women. The Association Press, New York. 1921. 222 pp. $1.75, postage included.

An analysis of the forces which must be reckoned with in influencing public opinion and community action. The book was written primarily to interpret the Community Movement to teachers, pastors, Y. M. C. A. and Y. W. C. A. secretaries and others interested in community leadership.

RURAL ORGANIZATION

Walter Burr, Professor of Sociology, Kansas State Agricultural College. The Macmillan Company, New York. 1921. XI + 250 pp. $2.25.

The book considers the rural community both from the economic and the human side. It takes up in detail such subjects as farm production, marketing, finance and transportation. Under community social functions it discusses education, sanitation and health, recreation, beautification and home making.

ROAD GUIDE OF THE LINCOLN HIGHWAY

The Lincoln Highway Association National Headquarters, Detroit, Mich. 1921. Fourth Edition. 336 pp. Maps. $2.50.

This official road guide contains a complete history of the Lincoln Highway and full information regarding mileage and places of interest along this famous transcontinental road.

THE PLAY MOVEMENT IN THE UNITED STATES

Clarence E. Rainwater, Ph.D., Assistant Professor of Sociology, University of Southern California. The University of Chicago Press, Chicago, Ill. 1922. XI + 371 pp. Illustrated., $2.90, postage included.

The author was for a number of years Director of the Hamilton Park Recreation Center in Chicago, and later Dean of The American College of Physical Education in the same city. The volume is an analysis of the play movement in the United States, including the activities occurring in social and community centers, in community music, drama, and pageantry, and in community service and organization.

LAND DRAINAGE

W. L. Powers, M. S., and T. A. H. Teeter, B. S. John Wiley & Sons, Inc., New York. 1922. IX + 270 pp. Tables, diagrams and illustrations. $2.75.

While this book deals with the subject of drainage primarily from the agricultural standpoint, it contains much of value to the contractor and engineer who has to do with the reclamation of arid and wet land. It is intended principally as a text-book for students of general agriculture and agricultural engineers, as a reference book for practical farmers, and as an aid to owners of wet, overflowed, marsh, swamp or alkaline land, and to contractors who would improve this type of land area.

SPECIAL LIBRARIES OF THE UNITED STATES

"Special Libraries Directory," edited by Dorsey W. Hyde, Jr., President of the Special Libraries Association. 1921. 123 pp. The libraries are listed alphabetically by name, and also geographically by states and cities. An explanatory paragraph describes the particular services each library is equipped to render. (Apply to Dorsey W. Hyde, Jr., President, Special Libraries Association, 3363 16th Street, N. W., Washington, D. C.)

BITUMINOUS PAVEMENTS

"Bituminous Pavement Investigations in Certain Texas Cities," Part II, by Roy M. Green, Manager Western Laboratories, Inc., Lincoln, Nebr. Published as Bulletin No. 24, Texas Engineering Experiment Station, by the Mechanical and Agricultural College of Texas, Central Station, Tex. 1921. 120 pp. Illustrated. Discusses asphaltic concrete, sheet asphalt, Uvalde rock asphalt, and Oklahoma rock asphalt. (Apply to J. C. Nagle, Director, Texas Engineering Experiment Station, Mechanical and Agricultural College of Texas, Central Station, Tex.)

WATER PURIFICATION

"Water Purification in Iowa," by Jack J. Hinman, Jr., 8 pp. 1921. Reprinted from the Proceedings of the Thirty-third Annual Meeting of the Iowa Engineering Society, Des Moines, January, 1921. (Apply to author, State University of Iowa, Ames, Iowa.)

COUNTY HIGHWAYS IN DELAWARE

Eighth Biennial Report of the New Castle County State Highway Commissioner, of New Castle County, Delaware, for the years 1919 and 1920. 28 pp. Maps and illustrations. (Apply to Charles E. Grubb, New Castle County State Highway Commissioner, Wilmington, Del.)

SAFETY FIRST FOR THE PUBLIC.

"An Analysis of Public Accidents." Published by the National Safety Council, 168 North Michigan Ave., Chicago, Ill. 1921. 10 pp. Includes an argument for the adoption of uniform public accident report forms. (Apply to publishers.)

TUBERCULOSIS PREVENTION IN CANADA

"Twenty-first Annual Report of the Canadian Association for the Prevention of Tuberculosis," including transactions of the annual meeting held in Toronto, May 21, 1921. 139 pp. (Apply to Robert E. Wodehouse, M. D., O.B.E., Bank Street Chambers, Ottawa, Can.)

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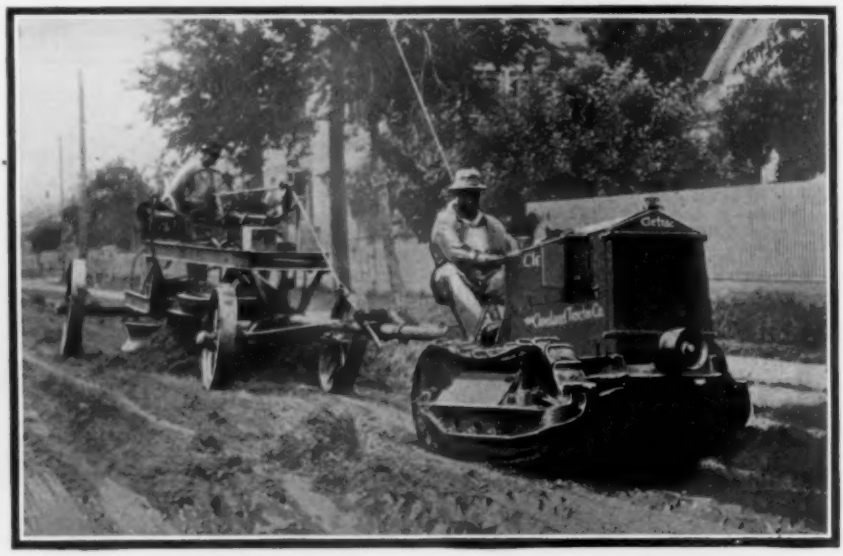
Report of the Commissioner of Education for the year ended June 30, 1921. 42 pp. (Apply to Dr. John James Tigert, Commissioner of Education, Washington, D. C.)



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The School Lunch," by Mary Pack. Published by the Extension Service in Agriculture and Home Economics, College of Agriculture, University of Illinois, Urbana, Ill., as Circular No. 41. 1921. 23 pp. Illustrated. Applicable especially in rural districts. (Apply to author, address above.)

A SHORT COURSE IN CIVICS

"Active Citizenship—A Study Outline," prepared by Charles Davidson, Ph.D. H. W. Wilson Company, New York, N. Y. 1921. 51 pp. 50 cents. Not a text-book, but an outline designed for the use of clubs or classes. (Apply to publishers.)

CANADIAN HIGHWAYS

Annual Report of the Department of Public Highways, Ontario, 1919. 1921. 101 pp. Illustrated. Published by order of the Legislative Assembly of Ontario. (Apply to F. C. Biggs, Minister of Public Works and Highways, Toronto, Ont.

PUBLIC HEALTH INSTITUTES IN THE UNITED STATES

Preliminary Announcement of a Series of Public Health Institutes to be held during 1921-22. Published as Official Circular V. D. No. 2 of the United States Public Health Service. 1921. 39 pp. List of cities in which such institutes will be held, together with programs. (Apply to The United States Public Health Service, 16 Seventh Street, S. W., Washington, D. C.)

SOURCES OF MUNICIPAL REVENUE

"New Sources of Revenue for New Jersey Municipalities," compiled by The Bureau of Municipal Information of the New Jersey State League of Municipalities, as Report No. 48. 31 pp. and appendix. $1. A careful tabulation of revenues with discussion and deductions from them. Two of the tables from the appendix are reproduced elsewhere in this issue. (Apply to Sedley H. Phinney, Executive Secretary, New Jersey State League of Municipalities, 712 American Mechanic Building, Trenton, N. J.)

WATER RESOURCES OF NEW JERSEY

"Report on the Water Resources of the State and Their Development," made by Hazen, Whipple & Fuller, for the Department of Conservation and Development of the State of New Jersey, 1922. 36 pp. Maps and illustrations. A thorough and detailed survey of the population and water requirements of the New Jersey Metropolitan District and the water resources which will meet those requirements for the next fifty years. (Apply to Hazen, Whipple & Fuller, 30 East 42nd Street, New York, N. Y.)

THE FINANCES OF KANSAS CITY, MO.

"Report on a Study of the Finance and Accounting Offices of Kansas City, Mo.," prepared by the Kansas City Public Service Institute. 1922. 103 pp. The information presented and the recommendations made are the result of nearly a year's study of the organization, methods and procedure of Kansas City and other cities, largely by Ray W. Wilson, Accountant of the Institute. It offers suggestions which, it is believed, would promote economy and efficiency. (Apply to the Kansas City Public Service Institute, 715 Kansas City Life Building, Kansas City, Mo.)

STREET SANITATION CONFERENCE

Report of Proceedings of the Second Annual Conference of the International Association of Street Sanitation Officials, held in Chicago in August, 1921. 43 pp. Illustrated. (Apply to A. M. Anderson, Secretary, 37 West Van Buren Street, Chicago, Ill.)

PROPOSED CHARTER FOR NEW YORK CITY

Home Rule Charter for the City of New York, proposed to the Charter Revision Commission by Charles L. Craig, Comptroller of the City of New York, 1922. 29 pp. (Apply to Charles L. Craig, Comptroller, New York, N. Y.)

NEW JERSEY SEWAGE WORKS ASSOCIATION

Proceedings of the Sixth Annual Meeting of the New Jersey Sewage Works Association, held in Trenton, February, 1921. 24 pp. (Apply to Myron E. Fuller, Secretary-Treasurer, 170 Broadway, New York City).

HOUSING CONDITIONS IN WINNIPEG

"Report on Housing Survey of Certain Selected Areas," made in March and April, 1921, by Ernest W. J. Hague, Assistant Chief Health Inspector, 1921. 101 pp. Illustrated. Also the "Report on a Survey of Vacant Houses in the City," made in January, 1922. 11 pp. (Apply to Dr. A. J. Douglas, Health Officer, Winnipeg, Manitoba, Can.)

AMERICAN LIBRARY ASSOCIATION CONFERENCE

Papers and Proceedings of the Forty-third Annual Meeting of the American Library Association, held in Swampscott, Mass., June, 1921. Published as the July number of the Bulletin of the American Library Association. 260 pp. Free to members. (Apply to Carl H. Milam, Secretary, American Library Association, 78 East Washington Street, Chicago, Ill.)

EDUCATION BUDGET FOR DETROIT

"An Analysis of the 1922-23 Budget Requirements of the Board of Education, City of Detroit," by Arthur B. Moehlman, J. F. Thomas and H. W. Anderson. Published as the February, 1922, number of **The Detroit Educational Bulletin.** 64 pp. Illustrated. (Apply to The Detroit Educational Bulletin, Board of Education, Detroit, Mich.)

RURAL SANITATION

"Sanitation and Sewage Disposal for Farmsteads and Country Estates," by William Paul Gerhard, C. E., Dr. Eng., Member American Public Health Association, 1922. 12 pp. 30 cents. (Apply to author, 17 West 42nd Street, New York, N. Y.)

HEALTH SURVEY OF LAFAYETTE, IND.

"Public Health Survey of Lafayette, Ind., and Tippecanoe County, Ind.," by Murray P. Horwood, Ph.D. Chapter I, "Water Supply," 1921. 23 pp. Illustrated. Published by the Tippecanoe County Tuberculosis Association, Lafayette, Ind. (Apply to publishers.)

CHARTER REVISION IN NEW YORK

"The New York City Charter—Report on Charter Revision," prepared by the City Club of New York, for submission to the New York Charter Commission, 1921. 40 pp. (Apply to Raymond V. Ingersoll, Secretary, City Club, 55 West 44th Street, New York, N. Y.)

FOREST FIRES IN NORTH CAROLINA

"Forest Fires in North Carolina during 1918, 1919, and 1920, and Forest Protection in North Carolina," by J. S. Holmes, State Forester. Published as Economic Paper No. 51, North Carolina Geological and Economic Survey, 1921. 82 pp. Illustrated. (Apply to Joseph Hyde Pratt, North Carolina Geological and Economic Survey, Raleigh, N. C.)

MINNESOTA STATE FIRE DEPARTMENT ASSOCIATION

"Proceedings of the Forty-Ninth Annual Convention of the Minnesota State Fire Department Association," held at International Falls, Minn., June, 1921. (Apply to Chief John A. Gross, Secretary, Red Wing, Minn.)

PUBLIC MARKETS

"Open Types of Public Markets," by McFall Kerbey. Published as Bulletin No. 1002, United States Department of Agriculture, 1921. 18 pp. Illustrated. (Apply to Bureau of Markets and Crop Estimates, United States Department of Agriculture, Washington, D. C.)

SHIPPING WATER SAMPLES

"A New Water Sample Shipping Case," with some observations on the changes that take place in stored samples of water, by R. R. Spencer, Assistant Surgeon, and H. P. Letton, Sanitary Engineer, United States Public Health Service. Reprint No. 425, Public Health Reports. 8 pp. Illustrated. (Apply to the United States Public Health Service, Washington, D. C.)

FIRE PREVENTION IN DETROIT

Report of the Fire Prevention Committee of the Detroit Board of Commerce on Fire Prevention Week, October 2-9, 1921. (Apply to J. Robbins, Secretary, Fire Prevention Committee, Detroit Board of Commerce, Detroit, Mich.)

OHIO STATE FIRE MARSHAL'S BULLETIN

Official Bulletin, Ohio State Fire Marshal's Department. October, 1921. 32 pp. (Apply to H. A. Dykeman,, State Fire Marshal, Wyandotte Building, Columbus, Ohio.)

BIBLIOGRAPHY OF CHILD HEALTH

Books on Health, as related to the School Child. Second Edition, Revised. Bibliography Bulletin 69, New York State Library. Published by the University of the State of New York. 1921. 37 pp. (Apply to James I. Wyer, Ph. D., Director of the State Library, Albany, N. Y.)

Making Good in Minneapolis

The "Caterpillar's" usefulness is not limited to hauling garbage. For grading streets and roads, removing snow, working on farm or ranch, in the mining, oil and lumber industries — wherever power and endurance is at a premium, the "Caterpillar"* has no real competitor. There is a "Caterpillar" of size and capacity for every power need.*

Because their officials have proved the "Caterpillar"* method the most practical and cheapest way of grading and maintaining roads, removing snow, and hauling materials, Minneapolis and Hennepin County, Minnesota, are now operating a fleet of 11 "Caterpillars."* New York, Chicago, Philadelphia, Akron, Dallas, Spokane and scores of other cities and towns are "Caterpillar"*-equipped in order to cut the cost of public works to the lowest figure. We shall be glad to exhibit motion pictures of "Caterpillars"* in action on jobs like yours, or send you a copy of our new booklet, "Caterpillar"* Performance.

There is but one "Caterpillar"—Holt builds it

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Methods, Materials and Appliances

News for City and County Engineers, City Managers, Water-Works Superintendents, City Controllers, Park Superintendents, Purchasing Agents, and Others Interested in the Economical Construction and Efficient Operation of Public Improvement Undertakings

Waterproofed Cement for Outdoor Swimming Pools

The construction of swimming pools by various communities has become one of the most interesting studies among engineers and municipal officials. One of the chief problems encountered is building a pool which will be water-tight, white, and will not stain.

The use of Medusa waterproofed white Portland cement, manufactured by the Sandusky Cement Company, 626 Engineers Building, Cleveland, Ohio, has overcome these difficulties in a number of pools. There are two outdoor pools where the use of this cement has been particularly notable. Both have plaster coats over a reinforced gray Portland cement base, one using the plain white cement and the other the waterproofed cement.

The outdoor pool at Riverside Park, near Springfield, Mass., is of the saucer type, built with reinforced concrete, and is some 300 feet in diameter. A finish plaster coat of Medusa plain white cement, white bank sand and hydrated lime was used. This pool has been in use about six years, and the white cement finish has withstood the severe weather of that part of the country, frequently reaching far below the zero mark; but in this case the cement has become discolored through the absorption of vegetable matter contained in the water of the Connecticut River, although the hydrated lime was supposed to make it impervious. If Medusa white waterproofed cement had been used in this work, at a cost of about $90 additional, this cause of discoloration by water coming up from beneath would have been overcome.

Another swimming pool which represents about the best in pool construction to-day is an outdoor pool, 60 x 40 feet, on the Henry Phipps estate, Westbury, L. I. This pool was built of concrete with a finished plaster coat of Medusa waterproofed white Portland cement and white crushed marble in a 1 to 2 mix. After the forms were stripped and the surface roughened, the plaster was applied in thin coats until a thickness of 1 inch was reached for the side walls. The floor was laid in one operation at a thickness of 2 inches. Expansion joints were placed perpendicularly on the side walls and across the floors, 10 feet on centers to a depth of ½-inch on walls and 1 inch in the floors. After three days, when the plaster had become sufficiently hardened, the entire surface was gone over carefully with a fine carborundum stone, sufficiently to remove the trowel marks, and then brush-coated with clear cement. This cement coating was allowed to remain until the operation was about completed, at which time it was again gone over with a fine carborundum stone with plenty of clean water, until a perfectly smooth surface was reached. This pool is very pleasing in appearance, and, after five years, resembles white marble.

The above operation may at first thought appear expensive. The first stone rubbing is the most costly, but when done at the proper time a square yard can be rubbed by hand in ten minutes. In the finish rubbing it is only necessary to remove the cement film to bring up a smooth surface. Most of this can be done by machine on good-sized operations.

Medusa waterproofed white Portland cement has been tested by the Y. M. C. A. Construction Department of New York City for absorption and discoloration from the body oils, and after three weeks' tryout at the indoor pool at 58th Street and 8th Avenue, New York City, it was pronounced a success.

CONCRETE SWIMMING POOL BUILT WITH WHITE WATER-PROOF CEMENT, HASTINGS, NEBR.

Tractors
for power, speed, economy

Preparing streets for repaving, breaking up old pavements, making new thoroughfares, all require an abundance of steady, dependable power.

Scarifiers, plows, drills, levelers, scrapers, graders, etc., do their best work, and more of it, when propelled by good tractors. This is because the tractor has the reserve power to keep the tool moving constantly at proper speeds and with proper adjustments for maximum results.

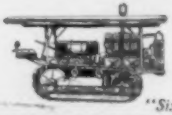
Tractors like the BEST concentrate the pulling power of a large number of animals within a small unit which is easy to manage, easy to maneuver, and which has none of the weaknesses of the flesh.

Best Tractors are famous for stamina, power and dependability, and their cost for up-keep and operation is small. That is why they are being adopted more and more by municipal, county and state officials for road and street making and maintenance.

Let us send you further details on the use of tractors for road and street work. Write for catalogs, prices and names of our nearest dealers.

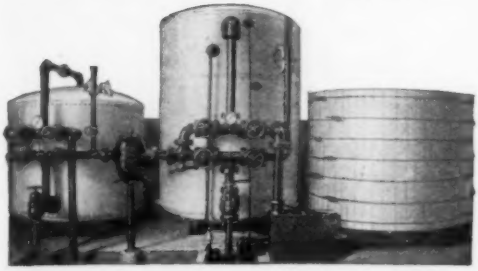
C. L. BEST TRACTOR CO.
SAN LEANDRO - CALIFORNIA

There are three models of Best Tractors—the "Sixty," the "Thirty" and the "Cruiser" (60). All are factory-built—not assembled.


"Sixty"

"Thirty"

"Cruiser"



A TYPICAL ZEOLITE SOFTENING AND FILTERING EQUIPMENT

Water-Softening for Municipal Supplies and Boiler Feed

The softening of municipal drinking-water supplies is receiving the attention of many cities and towns where reduction in the hardness of water is proving to be an economic and industrial necessity. For the solution of such problems, the Permutit Company, 440 Fourth Avenue, New York City, has had on the American market for a number of years its zeolite method of automatically softening water by extracting all of the hardness from the water without the addition of chemicals or the application of heat. A zeolite is a sodium aluminum silicate compound which possesses the remarkable property of exchanging its sodium for lime or magnesia when these elements come in contact with it in the form of hardness in water. Some of the properties of zeolite have been known to science for many years, but the first important advance was made by Dr. Robert Gans, who produced a stable artificial zeolite of high exchange value, and an apparatus for its practical use, thus paving the way for rapid commercial development.

Zeolite water-softeners are made in pressure and gravity types constructed with steel, concrete or wooden shells. Water to be softened flows slowly through the tank downward, its hardness being automatically removed. When the zeolite material needs renewing, all that is necessary is to flush it with a salt solution and then backwash with some of the softened water. Then the material is as good as new.

Economic and satisfactory power-plant operation demands that boilers be fed with water that is free from all scale, sludge and mud-forming impurities. For the prevention of scale, the Permutit Company offers a water-softening equipment of the zeolite type which is in use in several thousands of power-plants to-day and is effectively perventing the formation of any scale whatsoever. The complete removal of all scale-forming impurities from boiler feed water before it enters the boiler is the logical correct way to keep the boiler-heating surfaces clean. Simplicity, ease of operation and sure results are necessary, and are provided by this method. Sludge and mud-forming impurities can best be removed from boiler feed water by correct filtration.

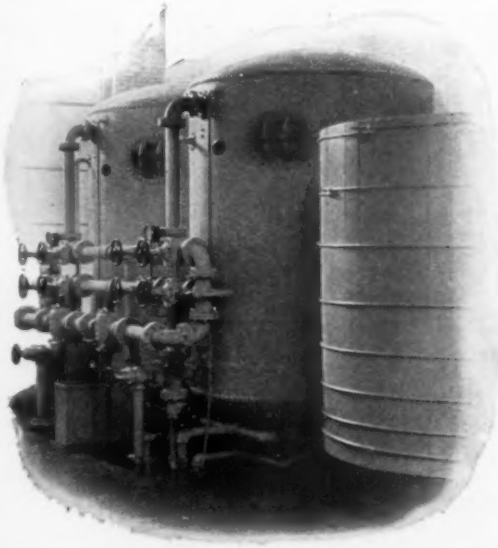
Permutit water rectification apparatus is also made for the removal of iron and manganese, oil, excess chlorine and ammonia.

New Engineering Firm

Under the firm name of Hudson & Myron, Engineers, Messrs. Leo Hudson and John P. Myron have formed a partnership for the practice of engineering, with offices at 808-810 Wabash Building, Pittsburgh, Pa. Mr. Hudson has been in private practice for the last fifteen years, principally in water-works, sewerage, power-plants, valuations and rates. Mr. Myron, until recently, was connected with the Pittsburgh Filter and Engineering Company.

Price With Kirkgasser

It has been announced that H. B. Price, formerly Advertising Manager of the Belden Manufacturing Company, Chicago, Ill., who has been connected with that company for several years in various engineering, production and sales capacities, has resigned and joined the advertising agency of George J. Kirkgasser & Company. Mr. Price will specialize in electrical and technical advertising, and in addition to an engineering education brings to his new work a wide practical experience in engineering, construction, sales and operation.



TYPICAL 24-HOUR BOILER FEED-WATER SOFTENING PLANT

TIFFIN

Street Flushers and Trucks

MORE MACHINES IN USE THAN ANY OTHER MAKE, BECAUSE THEY GET RESULTS. REAL MERIT ALWAYS COUNTS..... ASK FOR CATALOGS. THE TIFFIN WAGON CO., TIFFIN, O.

Makers, also, of Tiffin Motor Trucks, Farm and Dump wagons, and Municipal Vehicles.

Have Good Streets Cheap All Year' Round

Avery One-Man "Road-Razer" is the fastest, most satisfactory and economical machine made for keeping roads and streets good. One man and this machine can keep many miles of city streets in good condition the year 'round. Also solves the snow problem.

It shaves the roughest, ruttiest dirt streets in a few minutes' time. On rock and gravel roads, the scarifier attachment loosens up the surface and the "Road-Razer" blade shaves it down to a hard, smooth surface leaving the road better than new.

No other machine like it—a self-contained unit—blades and power in one machine. Turns in its own tracks in three seconds. Backs up instantly. Has wide, flexible, three section 12-foot blade that fits or shapes any curve or crown of the street. Equipped with powerful six-cylinder motor.

Sold on approval, subject to demonstration. Strongly guaranteed. Saves money for *tax payers* and solves the problem of road and street officials, the country over. .Write to-day for prices and complete information.

AVERY

Road Building and Road Maintenance Machinery

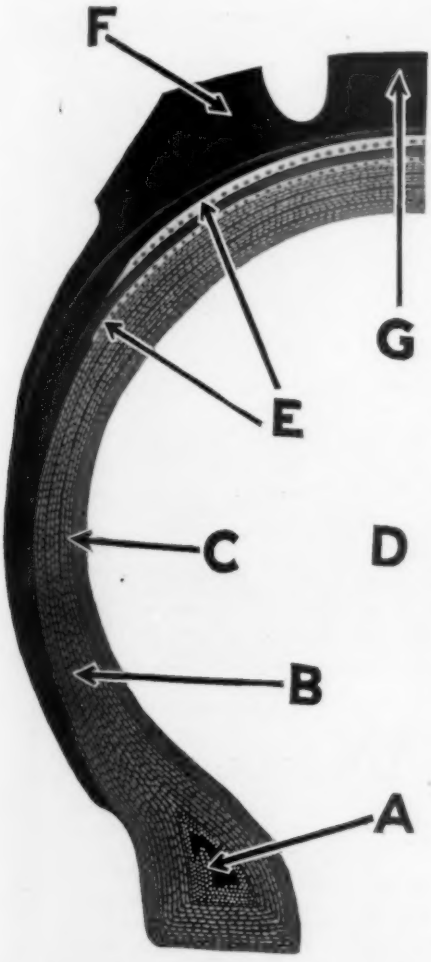
AVERY COMPANY

223 Iowa St. Peoria, Ill.

A Pneumatic Tire That Ruts Do Not Harm

Ruts need have no menace for the life of cord truck tires now that Goodyear has perfected and is marketing a "rut-proof" cord pneumatic truck tire.

Spectacular proof that this tire is practicable was afforded by a test in which these tires on a Goodyear Heights bus were run against the curbing for 500 miles. At the end of the test the sidewalls were not worn through. Ordinary pneumatic truck tires were worn through the sidewalls in less than five miles when run against the curb.



SECTION OF NEW PNEUMATIC TIRE

A—The Bead, B—Sidewall, C—Plies, D—Air Volume, E—Breaker Strip, F—Tread, G—The Cure.

The Goodyear "rust-proof" pneumatic truck tire is the result of objections to the use of pneumatic truck tires in some rural districts because of the premature wear of sidewalls, resulting from the contact of these large tires with the frozen ruts of winter and the sun-baked ruts of summer. This became more prominent as the use of motor trucks increased for intercity hauling over unimproved highways, and Goodyear engineers immediately started a thorough investigation of these conditions so as to make pneumatic truck tires more efficient for this class of service.

The engineers picked for development work a section of Ohio in and around New Philadelphia where there were a large number of pneumatic-tired trucks engaged in hauling coal. This particular section of Ohio seems to be a little backward in the improvement of highways, and road conditions were very severe during the fall, winter and spring months, as the dirt and clay roads would get soft with the heavy rains and then freeze with the cold weather. Ruts ran from 6 to 12 inches deep, so that if pneumatic-tired trucks traveled over the roads, the tires were running on the edge of the frozen ruts, constantly wearing away the sidewalls.

The engineers developed a tire with a specially compounded sidewall much thicker than the sidewall used on regular pneumatic truck tires, and put a number of these tires into use on these coal trucks. The results were declared to be very gratifying, and the idea was constantly improved, resulting in the Goodyear "Rut-Proof" cord pneumatic truck tires for use on trucks which are forced to use unimproved highways.

Tubular Steel Flag Poles

Many artistically executed flagpole monuments have lately been erected by leading architects who, no longer handicapped by the insufficiencies of the wooden pole, have used its successor, the tubular steel pole, for this purpose. This product appeared about 1900 in New York and was taken up as an exclusive specialty by the Pole & Tube Works, Inc., of Newark, N. J. The first few poles proving unduly expensive, a special hydraulic swaging machine capable of handling all sizes of steel pipe from 18 inches to 2 feet in diameter, was built. In this manner tubular poles are produced so nearly resembling the time-honored wood poles as to be almost indistinguishable in appearance, and of such construction as to remain permanently air-tight.

Under the constant vibration and occasionally severe deflections during hurricanes, none but the best-designed joint will remain tight; lead caulking will "creep"; pins or screws will loosen and open the way for moisture to attack the broken paint film. The appearance of a jointed tubular pole depends on the greatest number of least visible reductions to effect the taper—the greater the taper the better. The well-known tubular steel poles are second to the "continuous taper welded" type, which has been chosen by fastidious architects for monumental purposes, as shown in the photograph of the monument at Duluth, Minn., of which Cass

How to select the right machine for your road work

Machinery plays such a large part in the work of building and maintaining public highways, that it is important to select machines that will give the most satisfactory service. Here are a few suggestions:

First. Buy from a reliable, well-established concern that has the will and the organization to treat you right and to furnish service.

Second. Buy a machine that will stand up under all conditions. The machine that *lasts* is the one that is profitable to use.

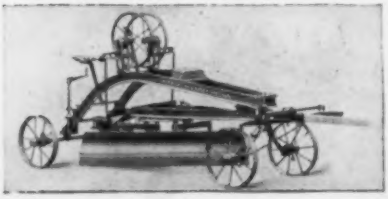
Third. Don't be too much concerned about price. Get your money's worth, but above all, get a good, serviceable machine.

Monarch Pressure Oil Distributor. Furnished either in the horse-drawn type or for mounting on motor trucks.

Keystone Corrugated Metal Culvert Pipe. Furnished in diameters from 8 to 72 inches any length desired. Guaranteed 25 years.

The Monarch Steam Road Roller with Steam Pressure Scarifier. A durable and dependable 3-wheeled 10-ton roller.

Champion Steel Rock Crusher. Mounted with Elevator, Screen and Portable Stone Bin. Made in several sizes, 15 to 300 tons daily.



The Winner Highway Patrol Road Grader, made in six different sizes. A one-man, two-horse machine for maintaining dirt and gravel roads. Weight 1150 pounds. Blade 6 feet long.

Ask for our new catalog "Everything for the Roadmaker"

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The GOOD ROADS MACHINERY Co INC.
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TUBULAR STEEL FLAGPOLE AT DULUTH, MINNNESOTA

Gilbert of New York is the architect. Another monument of this type, designed by Henry Bacon, New York architect, was recently dedicated at Naugatuck, Conn. This 110-foot pole is novel in so far as it is bronze-jacketed throughout its entire height of 88 feet above the bronze socle. The jacket was spirally wound under great tension, over the steel pipe, and seam-soldered, and will remain a permanent protection. Harmonizing with the bronze ornamentation, it presents an appearance of great beauty.

A Meter with Breakable Cast Iron Frost Bottom

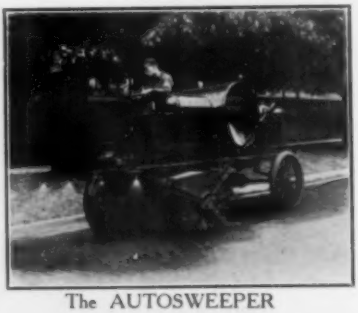
The Buffalo Meter Company, 2917 Main Street, Buffalo, N. Y., has been manufacturing disc water meters exclusively for 30 years, and its American meter in the present form was first placed on the market 18 years ago. To meet the demand of numerous water-works superintendents for meters with breakable frost bottoms, the Buffalo Meter Company is now making the American meter so that it can be supplied in that style of outside case. It is not the intention that this construction shall supersede the older styles of casings in which the meter has been supplied for many years. The frost-proof casing simply provides another type of casing so that that type most suitable for the service conditions may be supplied.

When the meter with a breakable frost bottom casing freezes up and the pressure in the pipe reaches 450 pounds, the bottom casing breaks out at the disc chamber seat. This permits all four parts of the disc chamber to separate and the intermediate gearing to separate at three points, thereby relieving each working part from injurious strain. Protection of the intermediate gearing by freedom of its parts to separate and move with the ice is patented. The disc chamber is supported in a shallow seat, so there is no possibility that it will stick or jam when necessary to remove it for inspection or cleaning. The disc chamber seat is entirely in the breakable bottom, so after each freezing a new and accurately machined seat is provided

WATER METER WITH BREAKABLE FROST BOTTOM

It is claimed that the American meter is the only meter with breakable frost bottom that assembles right side up, that is, the assembly starts by placing the disc chamber in the breakable bottom casing. The flange bolts may be drawn up unevenly or excessively tight and there is no chance of breaking the frost bottom or distorting the measuring chamber, because the pressure comes entirely on the flange gasket. All the features that have added to the accuracy of the Niagara and American meters have been retained in this new frost-proof model. The pivot bearing, intermediate gears, thick reinforced measuring disc, adjustment for high and low pressures, submerged bearings protected against sand and sediment, interchangeable round reading and straight reading registers are all found in the frost-proof model.

CUT STREET CLEANING COSTS SQUARELY IN HALF!



The AUTOSWEEPER

Works at *twice* the speed of horse-drawn sweepers. One AUTOSWEEPER does the work of *two* horse-drawn sweepers.

Sprays the street and sweeps it.

Placed near center of street, it is unequalled as a "feeder" to a pick-up sweeper.

Circular No. A-44 tells all about the AUTO-SWEEPER.

The ELGIN

A sentence from a sample letter:—

"We have made 50% saving in street cleaning since introducing the ELGIN, Aug. 20, 1918." Name on request.

You'll find "*The Eventual Method*" in The ELGIN: the machine that sprays the street, cleans the gutter, sweeps 10 ft. of pavement, collects the refuse and carts it away.

163 owners have 284 Elgin machines.

Circular No. A-48 describes The ELGIN.

The AUTO-EDUCTOR

During last September, Chicago's 7 AUTO-EDUCTORS cleaned 2,809 catch basins at $1.90 each.

In the same month, Chicago cleaned 1,165 catch basins by hand. These cost $4.41 each.

The AUTO-EDUCTOR *saved* $2.51 *per catch basin.*

Without alteration, and with little additional equipment, the AUTO-EDUCTOR becomes a flusher, sprinkler, tree-sprayer, snow plow, ordinary truck, etc. Can be used 365 days a year, both day and night.

Circular No A-50 tells how.

THE ELGIN LINE COMPRISES AMERICA'S LEADERS

ELGIN SALES CORPORATION

501 Fifth Avenue, NEW YORK **U. S. A.** **Old Colony Building, CHICAGO**

Elgin to Sell Otterson Eductor

Announcement has been made by George C. Dodge, President, Elgin Sales Corporation, 501 Fifth Avenue, New York City, that the Otterson Auto-Eductor for cleaning catch-basins has been taken over by the Elgin organization. It will be manufactured at Elgin, Ill., by the Elgin Street Sweeper Company and will be sold by the Elgin Sales Corporation and its representatives throughout the United States. The right of the Elgin Company in the Auto-Eductor cover only the United States and its possessions. Sales will be handled in exactly the same manner as those of the Elgin motor sweeper and other machines of the Elgin organizations.

Norwood Engineering Company Reorganized

On February 15, 1922, the Norwood Engineering Company, of Florence, Mass., underwent a reorganization. The major portion of the capital stock is owned by G. Wilson MacDow, of Boston. The business of the company will be conducted along the same lines and under the same management as at present, with a possible expansion if business warrants. Officers were elected as follows: President and Treasurer, Warren M. King; Vice-President and General Manager, H. W. Hosford; Clerk, H. B. Haven; Assistant Treasurer, G. Wilson MacDow. H. P. Otis of Florence, L. C. Perrin and R. N. Smithers of Boston, with the officers above named, comprise the Board of Directors.

Lang Retires as President of Lakewood

At the annual meeting of the Lakewood Engineering Company, Cleveland, Ohio, Charles F. Lang retired from the presidency. Reports from the field force show every indication of an increase of business in all departments, particularly in the paving and general construction fields. It has already been necessary to increase the factory force to meet the improved demand.

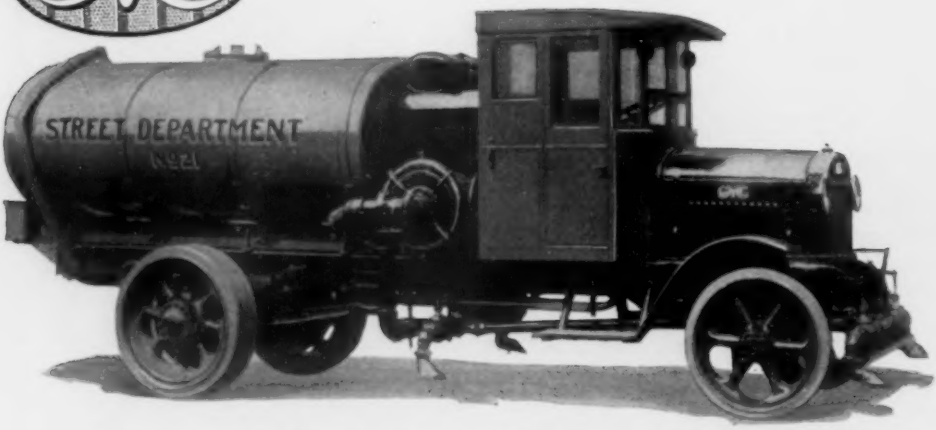
What Antigo Found in its Sewers

Not very long ago the city of Antigo, Wis., was thinking of digging up 450 feet of 24-inch sewer to remove the material that was clogging it. At that time the city got in touch with the Turbine Sewer Machine Company, Milwaukee, Wis., and a demonstration was given in which 2,000 feet of sewer was cleaned the first day. The sewer was found grown full of roots and clogged with sticks and mud, and the only way out of the trouble would have been to dig a new trench along the sewer and lay a new line, all of which would have cost a large sum of money. The purchase of a Turbine machine saved the cost of laying this new sewer. It took three men to hoist chunks of roots and rubbish from the manholes.

In addition to root growths, these machines have removed excess cement at joints and vitreous deposits from sewers in other cities.

A MASS OF LARGE ROOTS TAKEN FROM A 24-INCH SEWER AT ANTIGO, WIS.

General Motors Trucks



Keeping Austin, Minn., *Roads* In Good Condition

In Austin, Minnesota, as in almost every other hustling community, they appreciate the fact that good roads always lead to better business. And what's more, they have backed up their faith with works as well as words.

So nowadays when one drives into Austin, he is impressed at once by the "spic and span" appearance of the place which is traced immediately to the well-built, clean-kept roads. They leave such a pleasing impression with the visitor that he cannot help but become an enthusiastic booster for the town.

Keeping these good Austin streets clean and dustless has been the task allotted to the G M C truck shown in the photograph above. And it has done this work faithfully and well, providing the same dependable service day after day with uniformly low operating costs.

Many other towns, cities and villages are using G M C trucks with the same satisfying and economical results. For the G M C engine was designed exclusively for motor truck usage with full appreciation of all the essential qualities necessary for the success of such an engine under all conditions—economy of operation—surplus power—and quick accessibility for readjustment and replacement, with the consequential lowered costs for this work.

Removable Cylinder Sleeves

As an example of the practical accessibility of G M C construction it is possible to remove a cylinder sleeve from the G M C engine and replace it in a few hours. This eliminates the heavy repair expenses that follows when the entire cylinder block must be taken from the truck and remachined, as in the case of the common type of engine.

Each cylinder in a G M C engine is a separate sleeve which is pressed into place in the cylinder block. The sleeves are machined on both sides to accurate thickness and the expansion and construction of the walls under temperature changes, is consequently spread evenly, preventing the cylinder from becoming out of round and causing excessive wear.

No Lost Compression

Moreover this type of cylinder construction insures an absolute and continuous fit of piston rings and pistons, preventing any loss of compression as is the case of the common type of engine when cylinders become out of round.

This is only one of the many improved features of G M C construction that truck buyers everywhere appreciate because they insure more and better motor truck service at a lower cost for maintenance and operation.

Furthermore, with all these improvements, substantial reductions have also been made on the complete line of G M C trucks from one to five tons capacity which increase still further their practical economy for all hauling requirements. Write for a copy of our special truck book, it will be sent to you promptly without obligation.

GENERAL MOTORS TRUCK COMPANY

Division of General Motors Corporation

Pontiac, Michigan

DEALERS AND SERVICE IN MOST COMMUNITIES